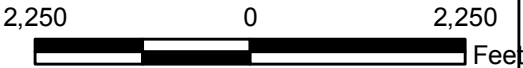


- Legend**
- General Location of Facilities
 - FEMA Mapped Floodplains
 - 100 Year Floodplain
 - 500 Year Floodplain

Source:
Floodplains from Federal Emergency Management
(FEMA) Q3 GIS data, 2005.



KALISPELL POLE & TIMBER, RELIANCE
and YALE OIL FACILITIES
KALISPELL, MONTANA

FIGURE 2-1
SITE LOCATION AND
KALISPELL VICINITY

TABLE 2-2
HISTORY OF PROPERTY OWNERS, OPERATORS, GENERATORS, AND TRANSPORTERS
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

	KPT Facility Tract 3B	KPT Facility Tract 5A	KPT Facility Tract 11CA	KPT Facility Tract 11C	KPT Facility Tract 3	KPT Facility Tract 19	KPT Facility Tract 19A	KPT Facility Tract 19B	KPT Facility Tract 30I
Property Owner & Ownership Dates	Somers Lumber Company Unknown - April 30, 1941	David McGinniss Unknown - May 21, 1938	Kalispell Pole and Timber Company ³ Unknown March 10, 1986	Kalispell Pole and Timber Company ³ Unknown March 10, 1986	William and Anne Russell Unknown - (Current Property Owner)	Kalispell Industrial Company Unknown - January 26, 1925	Kalispell Industrial Company Unknown - April 12, 1912	Kalispell Industrial Company Unknown - January 26, 1925	Kalispell Townsite Company Unknown - November 21, 1930
Property Owner & Ownership Dates	Glacier Park Hotel Company April 30, 1941 - September 8, 1945	Somers Lumber Company May 21, 1938 - September 8, 1945	Kal-Mont Lumber Company ³ March 20, 1986 - December 30, 1986	Kal-Mont Lumber Company ³ March 20, 1986 - December 30, 1986	No additional owners.	Rozenia Wooldridge January 26, 1925 - February 18, 1964	C.E. Conrad Memorial Cemetery Association April 12, 1912 - September 9, 1988 Kalispell Pole and Timber Company may have leased this property prior to 1988. The 1969 aerial photograph shows poles being stored in Tract 19A.	Rozenia Wooldridge January 26, 1925 - February 18, 1964	Boris A. S. Aronow November 21, 1930 - March 31, 1933 Mr. Aronow purchased the Reliance Refining Company in February 1932. The Reliance refinery was located on Tract 30Z. In March 1933, the Unity Petroleum Corporation was incorporated.
Property Owner & Ownership Dates	Great Northern Railroad Company September 8, 1945 - March 2, 1970 (Merger date) Kalispell Pole and Timber Company owned and operated a wood treatment and storage facility on property leased from the railroad company from as early as October 1945 to May 1990. The facility used PCP in the wood treatment process. Raw materials and products were transported by rail (until 1980) and truck.	Great Northern Railroad Company September 8, 1945 - March 2, 1970 (Merger date)	Robert Parmenter December 30, 1986 (Current Property Owner) Montana Mokko, Inc., owns and operates a lumber processing and storage facility on this property. The facility is not currently in operation.	Montana Mokko, Inc. December 30, 1986 (Current Property Owner) Montana Mokko, Inc., owns and operated a lumber processing and storage facility on this property. The facility is not currently in operation.	No additional owners.	William F. Behenna February 18, 1964 - June 8, 1987 Mr. Behenna was a long-time president of the Kalispell Pole and Timber Company. The 1969 aerial photograph shows poles being stored in Tract 19. Kalispell Pole and Timber Company owned and operated its facility until May 1990.	Kalispell Pole and Timber Company September 9, 1988 - June 1, 1990 Kalispell Pole and Timber Company owned and operated its facility until May 1990.	William F. Behenna February 18, 1964 - March 18, 1971 Mr. Behenna was a long-time President of the Kalispell Pole and Timber Company. Although the 1969 aerial photograph shows poles being stored in Tracts 19 and 19A, pole storage is not visible in Tract 19B.	Unity Petroleum Corporation March 31, 1933 - July 19, 1960 It is unknown what operations, if any, were conducted on this property.

TABLE 2-2
HISTORY OF PROPERTY OWNERS, OPERATORS, GENERATORS, AND TRANSPORTERS
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

	KPT Facility Tract 3B	KPT Facility Tract 5A	KPT Facility Tract 11CA	KPT Facility Tract 11C	KPT Facility Tract 3	KPT Facility Tract 19	KPT Facility Tract 19A	KPT Facility Tract 19B	KPT Facility Tract 30I
Property Owner & Ownership Dates	Burlington Northern Railroad Company March 2, 1970 - September 22, 1995 (Merger Date) Kalispell Pole and Timber Company owned and operated a wood treatment and storage facility on property leased from the railroad company from as early as October 1945 to May 1990. The facility used PCP in the wood treatment process. Raw materials and products were transported by rail (until 1980) and truck.	Burlington Northern Railroad Company March 2, 1970 - September 22, 1995 (Merger Date)	No additional owners.	No additional owners.	No additional owners.	Kalispell Pole and Timber Company June 8, 1987 - June 1, 1990 Kalispell Pole and Timber Company owned and operated its facility until May 1990.	Swank Enterprises June 1, 1990 - March 2, 1992 Swank Enterprises stored construction materials and equipment on the property.	Marie L. Miller and Earl C. Ellis March 18, 1971 - July 1, 1980	Flathead County July 19, 1960 - August 19, 1965
Property Owner & Ownership Dates	Burlington Northern and Santa Fe Railway Company September 22, 1995 - (Current Property Owner)	Burlington Northern and Santa Fe Railway Company September 22, 1995 - (Current Property Owner)	No additional owners.	No additional owners.	No additional owners.	Swank Enterprises June 1, 1990 - March 2, 1992 Swank Enterprises stored construction materials and equipment on the property.	Klingler Lumber Company, Inc. March 2, 1992 - (Current Property Owner) Klingler Lumber Company stores lumber and poles on the property.	Kalispell Pole and Timber Company July 1, 1980 - June 1, 1990 Kalispell Pole and Timber Company may have stored poles on this property. Kalispell Pole and Timber owned and operated its facility until May 1990.	Cedor B. Aronow August 19, 1965 - August 5, 1969
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	Klingler Lumber Company, Inc. March 2, 1992 - (Current Property Owner) Klingler Lumber Company stores lumber and poles on the property.	No additional owners.	Swank Enterprises June 1, 1990 - March 2, 1992 Swank Enterprises stored construction materials and equipment on the property.	Kalispell Pole and Timber Company August 5, 1969 - June 1, 1990 The 1987 aerial photograph shows poles being stored in Tract 30I. Kalispell Pole and Timber Company owned and operated its facility until May 1990

TABLE 2-2
HISTORY OF PROPERTY OWNERS, OPERATORS, GENERATORS, AND TRANSPORTERS
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

	KPT Facility Tract 3B	KPT Facility Tract 5A	KPT Facility Tract 11CA	KPT Facility Tract 11C	KPT Facility Tract 3	KPT Facility Tract 19	KPT Facility Tract 19A	KPT Facility Tract 19B	KPT Facility Tract 30I
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	Klingler Lumber Company, Inc. March 2, 1992 - (Current Property Owner) Klingler Lumber Company stores lumber and poles on the property.	Swank Enterprises June 1, 1990 - March 2, 1992 Swank Enterprises stored construction materials and equipment on the property.
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	Klingler Lumber Company, Inc. March 2, 1992 - (Current Property Owner) Klingler Lumber Company stores lumber and poles on the property.
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.
Additional Notes	Other lumber companies, including Montana Mokko, Inc. and Klingler Lumber Company, Inc., have or are currently leasing portions of Tract 3B.	Other lumber companies, including Klingler Lumber Company, Inc., have or are currently leasing portions of Tract 5A.	A portion of the Montana Mokko, Inc. facility is located in Tract 3B. ³ Information obtained from Flathead County Plat Room personnel (TTEMI 2005e)	A portion of the Montana Mokko, Inc. facility is located in Tract 3B. ³ Information obtained from Flathead County Plat Room personnel (TTEMI 2005e)	None.	On March 2, 1992, Swank Enterprises sold Tract 19 to Klingler Lumber Company, Inc. pursuant to an unrecorded deed (DEQ 2005b).	On March 2, 1992, Swank Enterprises sold Tract 19A to Klingler Lumber Company, Inc. pursuant to an unrecorded deed (DEQ 2005b).	Tract 19B was created through the property sale by William F. Behenna on July 1, 1980. Prior to this sale, the property was within Tract 19. On March 2, 1992, Swank Enterprises sold Tract 19B to Klingler Lumber Company, Inc. pursuant to an unrecorded deed (DEQ 2005b)	It is unknown if Schumacher's Evergreen Fuel Company leased Tract 30Z from Flathead County or Cedor B. Aronow during its period of operation (1962 to 1969). On March 2, 1992, Swank Enterprises sold tract 30I to Klingler Lumber Company, Inc. pursuant to an unrecorded deed (DEQ 2005b).

TABLE 2-2
HISTORY OF PROPERTY OWNERS, OPERATORS, GENERATORS, AND TRANSPORTERS
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

	KPT Facility Tract 30V (West Portion)	Reliance Facility Tract 30V (East Portion)	Reliance Facility Tract 30Z	Reliance Facility Tract 30S	Yale Oil Facility Tract 6B	Yale Oil Facility Tract 9B	Yale Oil Facility Tract 11	Yale Oil Facility Tract 11D	Yale Oil Facility Tract 11A
Property Owner & Ownership Dates	Kalispell Townsite Company Unknown - January 23, 1926		Kalispell Townsite Company Unknown - November 21, 1930	JTL Group, Inc. (McElroy & Wilken) Unknown - (Current Owner)	William and Ida Hafferman Unknown - March 23, 1938	S.C. and Laura Rhone Unknown - April 11, 1940	Jessie Hamil Unknown - December 13, 1937	Jessie Hamil Unknown - December 13, 1937	Flathead County Unknown - (Current Property Owner)
Property Owner & Ownership Dates	Reliance Refining Company January 23, 1926 - November 21, 1930 The Reliance Refining Company owned and operated a refinery on this property. Crude oil and refinery products were transported by rail and truck. The 1950 Sanborn Map shows the refinery, storage tanks, and loading platform on the eastern portion of the property. An office, oil truck building, and gasoline and oil storage building are shown on the western portion of the property.		Boris A. S. Aronow November 21, 1930 - March 31, 1933 Mr. Aronow purchased the Reliance Refining Company in February 1932. The Reliance refinery was located on Tract 30Z. In March 1933, the Unity Petroleum Corporation was incorporated.	No additional owners.	Yale Oil Corporation of South Dakota March 23, 1938 - April 29, 1944 Yale Oil Corporation built a loading platform and pump house on Tract 6B. Yale Oil also granted an easement to the Great Northern Railroad Company to construct and operate a spur track to serve the refinery.	Yale Oil Corporation of South Dakota April 11, 1940 - April 29, 1944 Tract 9B does not appear to be separate property from Tract 11 (refinery) on the 1950 Sanborn Fire Insurance Map. However, there are no buildings or storage tanks noted on the Sanborn Map.	Yale Oil Corporation of South Dakota December, 1937 - April 29, 1944 Yale Oil Corporation owned and operated a refinery and bulk storage plant on the property until 1944. Crude oil and refinery products were transported by rail and truck.	Yale Oil Corporation of South Dakota December, 1937 - April 29, 1944 Yale Oil Corporation owned and operated a refinery and bulk storage plant on the property until 1944. Crude oil and refinery products were transported by rail and truck.	No additional owners.
Property Owner & Ownership Dates	State of Montana November 21, 1930 - (Current Property Owner) Boris A. S. Aronow and Unity Petroleum Corporation owned and operated the refinery on property leased from the state as early as 1933 through 1969. Mr. Aronow (doing business as Unity Petroleum Corporation) leased Tract 30V from December 5, 1930 to November 26, 1935. Unity Petroleum Corporation leased the property from 1935 to 1969. Crude oil and refinery products were transported by rail and truck. Schumacher's Evergreen Fuel Company conducted bulk storage operations from 1962 to 1969. Kalispell Pole and Timber leased tract 30V for pole storage from August 13, 1969 to May 1990; the lease was terminated on January 28, 1994. Pole storage was visible in the western portion of the property (west of Flathead Drive) on the 1969 and 1987 aerial photographs.		Unity Petroleum Corporation March 31, 1933 - July 19, 1960 The Unity Petroleum Corporation owned and operated bulk storage tanks on this property. Crude oil and refinery products were transported by rail and truck. It is unknown when the tanks were constructed, as they are not identified on the Sanborn Fire Insurance Maps for the refinery.	No additional owners.	Leader Oil Company April 29, 1944 (Purchased and sold on the same day)	Leader Oil Company April 29, 1944 (Purchased and sold on the same day)	Leader Oil Company April 29, 1944 (Purchased and sold on the same day)	Leader Oil Company April 29, 1944 (Purchased and sold on the same day)	No additional owners.

TABLE 2-2
HISTORY OF PROPERTY OWNERS, OPERATORS, GENERATORS, AND TRANSPORTERS
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

	KPT Facility Tract 30V (West Portion)	Reliance Facility Tract 30V (East Portion)	Reliance Facility Tract 30Z	Reliance Facility Tract 30S	Yale Oil Facility Tract 6B	Yale Oil Facility Tract 9B	Yale Oil Facility Tract 11	Yale Oil Facility Tract 11D	Yale Oil Facility Tract 11A
Property Owner & Ownership Dates	No additional owners.	No additional owners.	Flathead County July 19, 1960 - August 19, 1965	No additional owners.	Carter Oil Company April 29, 1944 - December 15, 1959 (Merger Date) The 1950 Sanborn Fire Insurance Map shows the loading platform located adjacent to (west of) the spur track. The pump house and two sumps are also identified on the Sanborn map. The sumps are located south of the loading platform and the pump house is located southeast of the platform and adjacent to (north of) Montclair Drive.	Carter Oil Company April 29, 1944 - November 10, 1948 (Sold before merger)	Carter Oil Company April 29, 1944 - December 15, 1959 (Merger Date) Carter Oil Company ceased refinery operations shortly after purchasing the refinery. As early as 1954, Carter Oil leased the property to T.J. Landry Oil Company that owned and operated an oil distributorship onsite until 1978. It is unknown how petroleum products were transported.	Carter Oil Company April 29, 1944 - December 15, 1959 (Merger Date) Carter Oil Company ceased refinery operations shortly after purchasing the refinery. As early as 1954, Carter Oil leased the property to T.J. Landry Oil Company that owned and operated an oil distributorship onsite until 1978. It is unknown how petroleum products were transported.	No additional owners.
Property Owner & Ownership Dates	No additional owners.	No additional owners.	Cedor B. Aronow August 19, 1965 - August 5, 1969	No additional owners.	Humble Oil & Refining Company December 15, 1959 - December 26, 1972 (Merger Date) It appears that the loading platform, sumps, and pump house were no longer in use by 1963. These features are identified on the 1963 Sanborn map, but have been crossed out. Normally, the note "not used" is annotated on these maps.	Sid Ludwig Agency of Kalispell November 10, 1948 - November 26, 1948	Humble Oil & Refining Company December 15, 1959 - December 26, 1972 (Merger Date) Humble Oil & Refining Company continued to lease the property to T.J. Landry Oil Company that owned and operated the oil distributorship until 1978. It is unknown how petroleum products were transported.	Humble Oil & Refining Company December 15, 1959 - Unknown The 1963 Sanborn Fire Insurance Map shows an unused pump house located in this portion of the property. The 1961 aerial photograph also shows this building. The 1969 aerial map shows a new building has been built.	No additional owners.
Property Owner & Ownership Dates	No additional owners.	No additional owners.	Kalispell Pole and Timber Company August 5, 1969 - June 1, 1990 Kalispell Pole and Timber Company may have stored poles on this property. Kalispell Pole and Timber owned and operated its facility until May 1990.	No additional owners.	Exxon Corporation December 26, 1972 - February 12, 1980	Westmont Tractor and Equipment Company of Missoula November 26, 1948 - August 1, 1984	Exxon Corporation December 26, 1972 - February 12, 1980 Exxon Corporation continued to lease the property to T.J. Landry Oil Company that owned and operated the oil distributorship until 1978. It is unknown how petroleum products were transported.	Montana Power Company Unknown - Unknown An April 15, 1994, report prepared by Applied Earth Sciences, Inc. for Exxon Company, U.S.A., contains a piping location map that identifies the Montana Power Company as the owner of the property (Tract 11D).	No additional owners.

TABLE 2-2
HISTORY OF PROPERTY OWNERS, OPERATORS, GENERATORS, AND TRANSPORTERS
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

	KPT Facility Tract 30V (West Portion)	Reliance Facility Tract 30V (East Portion)	Reliance Facility Tract 30Z	Reliance Facility Tract 30S	Yale Oil Facility Tract 6B	Yale Oil Facility Tract 9B	Yale Oil Facility Tract 11	Yale Oil Facility Tract 11D	Yale Oil Facility Tract 11A
Property Owner & Ownership Dates	No additional owners.	No additional owners.	Swank Enterprises June 1, 1990 - (Current Property Owner)	No additional owners.	Exxon Education Foundation February 12, 1980 - December 3, 1981	Wesley and Pamela Homquist August 1, 1984 (Current Property Owners)	Exxon Education Foundation February 12, 1980 - December 3, 1981	NorthWestern Energy Unknown - (Current Property Owner)	No additional owners.
			Swank Enterprises stored construction materials and equipment on the property. Swank Enterprises is not currently storing anything on the property.						
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	National Development Corporation of Colorado December 3, 1981 - October 19, 1983	No additional owners.	National Development Corporation of Colorado December 3, 1981 - October 19, 1983	No additional owners.	No additional owners.
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	Exxon Education Foundation ¹ October 19, 1983 - January 11, 1989	No additional owners.	Exxon Education Foundation ¹ October 19, 1983 - January 11, 1988	No additional owners.	No additional owners.
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	Exxon Corporation ¹ January 11, 1989 - August 23, 1996	No additional owners.	Exxon Corporation ^{1, 2} January 11, 1989 - October 18, 1996	No additional owners.	No additional owners.
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	Pacific Hide & Fur Depot ¹ August 23, 1996 - (Current Property Owner)	No additional owners.	First X Realty, L.P. ² October 18, 1996 - September 4, 1997		
Property Owner & Ownership Dates	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	No additional owners.	KalisPELL Partners, LLC ² September 4, 1997 - (Current Property Owner)	No additional owners.	No additional owners.
Additional Notes	None.	None.	It is unknown if Schumacher's Evergreen Fuel Company leased Tract 30Z from Flathead County or Cedor B. Aronow during its period of operation (1962 to 1969).	No refinery operations or storage occurred on Tract 30S. However, the northeast portion of this tract is considered part of the Reliance Facility because of contamination in subsurface soils.	¹ Information obtained from Flathead County Plat Room personnel (TTEMI 2005b).	None.	¹ Information obtained from Flathead County Plat Room personnel (TTEMI 2005b). ² Information obtained from DEQ-provided deeds (DEQ 2005b).	Flathead County records do not list an owner for Tract 11D. The property type is listed as other, which contains roads, rivers, and unclassified parcels.	It is assumed Tract 11A is a highway right-of-way easement granted to Flathead County. Tract 11A is located in the northwestern corner of Tract 11D at the intersection of Flathead Drive and Montclair Drive.

TABLE 2-3
SUMMARY OF INVESTIGATIONS AND INTERIM ACTIONS
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Facility	Year at Facility	Investigation Title	Year Published	Contractor	Summary of Investigation Activities
KPT	August 10, 1983	Preliminary Assessment	July 17, 1985	DEQ (formerly MDHES)	A preliminary site assessment was written for the KPT facility based on an on-site visit to the property by Montanan Department of Environmental Quality (MDEQ) personnel on August 10, 1983. The assessment noted the potential for PCP contamination at the facility.
Reliance	1985	<i>Field Investigation Report, Reliance Refinery, Kalispell, Montana</i>	October 30, 1985	DEQ	DEQ conducted an initial field investigation; eight test pits were dug along the eastern edge of the property and two samples were obtained and analyzed for total metals.
Yale Oil	July & September 1985	<i>Subsurface Investigation and Remedial Action Plan, Exxon Bulk Plant, Kalispell, Montana</i>	October 14, 1985	Applied Earth Sciences, Inc. (AES)	12 monitoring wells installed (two wells already existed on property, W-5 and W-6); MW-1 through MW-4 and MW-7 through MW-14. A total of 29 samples collected during the investigation: 10 samples (5 groundwater, 4 soil, and 1 sludge) were sent to Rocky Mountain Analytical Laboratories and 19 samples (1 background soil, 2 source material, 1 free product, 5 groundwater, and 10 subsurface soil) were sent to EA Engineering for analysis.
Yale Oil	February 1986	<i>Oil Spill Investigation and Remedial Action Plan, Exxon Bulk Plant, Kalispell, Montana</i>	May 14, 1986	AES	Three product samples retrieved; two from inside the tank bottom and one from next to tank bottom, where product was visible. Three monitoring wells (MW-15, MW-16, and MW-17) were installed but not developed. Soil samples were collected from the boreholes every 5 feet unless soil type changed. Twelve soil samples were collected, but only six were analyzed (two from each borehole).
Yale Oil	February & March 1986	<i>Report of Sampling Activities, Yale Refinery, Kalispell, Montana</i>	May 6, 1986	U.S. Environmental Protection Agency (EPA) Field Investigation Team (FIT)	Groundwater samples were collected from five monitoring wells previously installed by AES in 1985. Two soil samples were collected from the Yale Oil site, and a third was collected from the Montana Power Company tract (6B). One sludge sample was obtained from the southern edge of the abandoned tank bottom.
		<i>Draft Analytical Results Report, Yale Refinery, Kalispell, Montana</i>	July 31, 1986	EPA FIT	Document discusses the results of laboratory analysis on samples acquired during the field investigation conducted at the Yale Oil facility in February and March 1986.
Yale Oil	June 30, 1986	<i>Sampling Activities Report, Yale Refinery, Kalispell, Montana</i>	August 5, 1986	EPA FIT	Additional sampling was conducted at the Yale Oil site to test for dioxin contamination. All samples taken by FIT were split with AES. Three shallow soil samples were collected as well as one sludge sample from within the abandoned tank bottom.
Yale Oil	June 30, 1986	<i>Addendum to Oil Spill Investigation and Remedial Action Plan, Exxon Bulk Plant, Kalispell, Montana</i>	September 17, 1986	AES	This document discusses the sampling event that took place on June 30, 1986 (above) by the EPA FIT. One background soil sample (RR-SO-8) is mentioned as being collected 3,000 feet due west of the Exxon site. This sample served as the background sample for both the Yale and Reliance Refinery sites. In addition, this document addresses the comments made by DEQ to the remedial action plan submitted on May 14, 1986.
Reliance	February & March 1986	<i>Sampling Activities Report for Reliance Refinery, Kalispell, Montana</i>	April 15, 1986	EPA FIT	Investigation of site; three monitoring wells installed (RR-MW-1 through RR-MW-3), seven groundwater samples collected including one residential well and a municipal supply well, four soil samples (including one background soil sample), and two sludge samples. An electromagnetic survey was also conducted to identify buried metal.

TABLE 2-3
SUMMARY OF INVESTIGATIONS AND INTERIM ACTIONS
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Facility	Year at Facility	Investigation Title	Year Published	Contractor	Summary of Investigation Activities
	February & March 1986	<i>Draft Analytical Results for Reliance Refinery, Kalispell, Montana</i>	July 22, 1986	EPA FIT	Document outlines results of laboratory analysis on samples acquired during the field investigation of the Reliance site in February and June 1986.
Reliance	June 30, 1986	<i>Sampling Activities Report, Reliance Refinery, Kalispell, Montana</i>	August 4, 1986	EPA FIT	Collection of four surface soil samples and five sludge samples to evaluate dioxin contamination at the Reliance site. Samples were collected concurrently with the Yale Oil site on June 30, 1986.
		<i>Draft Analytical Results, Reliance Refinery, Kalispell, Montana</i>	October 21, 1986	EPA FIT	Document outlines results of laboratory analysis on samples acquired during the field investigation of the Reliance site in June 1986.
Reliance / KPT	October & November 1988	<i>Final Report for Kalispell Post and Pole/Reliance Refinery, Kalispell, Montana</i>	June 30, 1989	MSE, Inc (MSE)	Three monitoring wells were installed on the Kalispell Pole and Timber Co. (KPT) property. Five groundwater samples were collected from KPT, two were collected from Reliance wells RR-MW-1 & RR-MW-2, and one groundwater sample was collected from Yale Oil monitoring well MW-12. Six soil samples were obtained (three from KPT and three from Reliance), and one sludge sample was collected from a buried drum on the Reliance site.
KPT / Yale Oil / Reliance	1989	<i>Final Phase II Site Investigation Sampling and Analytical Results Report for the Kalispell Pole and Timber Site</i>	June 1990	MSE	Two monitoring wells were installed on the KPT Co. property, one shallow (GW-5, 26 ft) and one deep (GW-4, 135 ft). Nine groundwater samples were collected, two from the new monitoring wells on the KPT site, four from Yale Refinery monitoring wells (GW-4, GW-12, GW-13, GW-14), and three QA samples. Water level and survey measurements were performed on all existing wells at the KPT, Reliance, and Yale Oil properties.
KPT	June 1991	<i>Sampling and Analytical Results Report for the Kalispell Pole and Timber Site</i>	October 1991	MSE	Three monitoring wells at KPT were sampled (GW-3, GW-4, and GW-5) and nine residential wells to the northeast, east, and southeast of KPT were sampled. The Evergreen Water District Well #1 (northeast) was also sampled.
KPT / Reliance	August 1991	<i>Preliminary Extent of Soil Contamination & Hydrogeological Investigation - Kalispell Pole & Timber Site</i>	February 1992	EPA contracts Roy F. Weston Inc.	Field activities were conducted in three phases: Phase I - 12 soil samples were collected from KPT and five soil samples were collected from the Reliance site. Phase II - 12 monitoring wells (five on KPT, three on Reliance, four on Yale Oil) were sampled. Phase III - 15 trenches and nine test pits within the KPT site and 133 surface and subsurface soil samples were collected.
Wal-Mart	1991	<i>Phase I Environmental Site Assessment for Wal-Mart Development, Evergreen, Montana</i>	October 1991	NTL Engineering and Geoscience, Inc. (NTL)	Historical document review and interviews with current owners, adjacent business owners, and local and state officials to evaluate potential environmental impacts to the property. Based on proximity to KPT, Reliance, and Yale Oil facilities, a Phase II ESA is recommended.
Wal-Mart	1991	<i>Geotechnical Investigation, Wal-Mart Retail Development, Evergreen, Montana</i>	October 25, 1991	NTL	Twenty eight borings were installed and two test pits. The work was performed to determine soil characteristics for building construction and engineering. Approximately 128 soil samples were retrieved during excavation of the borings; used to analyze for soil moisture, compression, and related factors.

TABLE 2-3
SUMMARY OF INVESTIGATIONS AND INTERIM ACTIONS
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Facility	Year at Facility	Investigation Title	Year Published	Contractor	Summary of Investigation Activities
Wal-Mart	1992	<i>Phase II Environmental Site Assessment, Wal-Mart Retail Development, Evergreen, Montana</i>	February 1992	NTL	Four borings installed (EH-1 through EH-4) and soil samples collected from each boring. Monitoring wells were installed in the three of the borings (EH-1, EH-2, and EH-3). All three wells were sampled in addition to a residential well, RW-1. Impacts of refinery operations noted and a Phase III ESA is recommended.
Wal-Mart	1992	<i>Phase III Environmental Site Assessment Seaman Mobile Homes, Kalispell, Montana</i>	August 24, 1992	Spratt & Associates Consulting Hydrogeology	Twenty three borings installed on the property; eight were completed as monitoring wells (SW-5 through SW-12). Wells EH-1, MW-14, SW-5, SW-6, and SW-7 were sampled for analysis of groundwater.
Wal-Mart	March 1993	<i>Initial Site Assessment Preliminary Report</i>	March 29, 1993	Spratt & Associates Consulting Hydrogeology	Four monitoring wells were installed (PW-1, PW-2C, PW-2D, and PW-3) on the premises. Four soil samples were collected from the boreholes before the wells were finished. When the wells were completed, four groundwater samples were obtained from each new well. Envirocon, Inc., provided oversight.
Wal-Mart	1993	<i>Larsen Property Groundwater Investigation</i>	May 7, 1993	Envirocon, Inc.	Envirocon, Inc., report detailing the monitoring well installation, sampling and analytical results from Spratt & Associates work in March 1993 (see above).
Yale Oil	November 1992 - September 1993	<i>Abatement Activities Report for Aboveground Tank Bottom and Underground Piping, Exxon Former Bulk Plant, Kalispell, Montana</i>	April 15, 1994	AES	Removal action included demolishing all structures on property, removing old piping, excavating and removing the tank bottom. In addition, contaminated soil was treated by thermal desorption (approx. 10,465 cubic yards) and replaced.
Wal-Mart	1994-1995	<i>Remedial Action Report, Jefferson Center, Kalispell, Montana</i>	March 1, 1995	Tetra Tech, Inc.	Remediation work plan outlining the soil sampling, contaminated soil removal, soil permeability testing, monitoring well and an SVE/air sparging system installation, and monitoring at the Wal-Mart property. (Four new wells installed, NW-1 through NW-4, and several existing wells redrilled.)
Yale Oil	April 1995	<i>Final Quarterly Status Report, Former Exxon Kalispell Bulk Plant, Kalispell, Montana</i>	May 22, 1995	Secor International, Inc.	Quarterly groundwater sampling at the Yale Oil Refinery site. Three quarters of the Yale Oil monitoring wells, GWY-3, GWY-4 and GWY-7 through GWY-13, were sampled in April, August, and October 1995.
	August 1995		September 25, 1995		
	October 1995		November 27, 1995		
Wal-Mart	June 1995	<i>Phase II Environmental Site Assessment</i>	June 1995	Tetra Tech, Inc.	Four borings installed (Borings 1 through 4) on the northwest corner of the Wal-Mart property. Soil samples were collected from each boring. Temporary monitoring wells were installed in each boring, and groundwater samples were obtained from each. A permanent well was constructed at Boring 1, but the other three temporary wells were abandoned.
KPT	November 1994 - April 1995	<i>Site Investigation Report for Kalispell Pole & Timber, Kalispell, Montana</i>	July 1995	Remediation Technologies, Inc. (RETEC)	Eight monitoring wells were installed on the KPT property (KPT-1 through KPT-8; in addition to GW-1 through GW-5 installed during the Weston 1992 investigation). Groundwater samples were collected from the new wells and soil samples were obtained from depths of 2 to 20 feet bgs at many of the same locations as in the Weston 1992 study.

TABLE 2-3
SUMMARY OF INVESTIGATIONS AND INTERIM ACTIONS
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Facility	Year at Facility	Investigation Title	Year Published	Contractor	Summary of Investigation Activities
Reliance	1996	<i>Draft Feasibility Study Report for the Reliance Refinery Site</i>	December 1997	Pioneer Technical Services, Inc. (PTS)	PTS prepared a Feasibility Study (FS) for the Reliance facility in 1996 in order to evaluate potential remediation alternatives for surface and subsurface soils and sludge.
Reliance / Yale Oil / KPT	March & April 1996	<i>Final Phase I Remedial Investigation Report for the Reliance Refinery Site, Kalispell, Montana</i>	December 2000	PTS	Four monitoring wells were installed (GWRR-4 through GWRR-7). Nine groundwater samples were collected (seven from Reliance, one from KPT well GW-5, and one from Reliance well MW-12). In all, 99 test pits were excavated and 115 soil samples were sent to a laboratory for analysis.
North of Reliance / Northeast of KPT	May 1996	None	Data received but no report issued	DEQ	DEQ samples the Rask residential well because of reports of a diesel odor and dark gray material in water softener (as reported by resident). Residence is connected to public water supply.
KPT	August 1996	<i>Supplemental Remedial Investigation Report, Kalispell Pole & Timber, Kalispell, Montana</i>	March 16, 1998	Remediation Technologies, Inc. (RETEC)	Seventeen test pits (TP-100 through TP-104; TP-106 through TP-117) were dug on the KPT property and 15 soil samples were collected. Seven monitoring wells were also installed (KPT-9 through KPT-15). Groundwater samples were collected periodically on all accessible wells on KPT, Reliance, and Yale Oil facilities from September 1996 to August 1997.
KPT	1996	<i>Work Plan for an Air Sparging Interim Measure at the Kalispell Pole and Timber Site, Kalispell, Montana.</i>	May 1996	RETEC	Discussion of pilot-scale air-sparging system installed along the BNSF property boundary. Eleven air injection wells (ASW-1 through ASW-11) were constructed on the KPT property and were operational in September 1996.
Reliance	May 1998	None	Data received but no report issued	DEQ	DEQ personnel collected 50 shallow soil samples from the Reliance facility.
KPT	June, July, & August 1998	<i>Pentachlorophenol Hot Spot Removal Work Plan</i>	January 15, 1999	The Retec Group, Inc. (formerly ThermoRetec Consulting Corporation)	Sixty-nine soil samples were collected from 42 locations on the KPT property to delineate PCP "hot spots" as part of a 1996 work plan. The results of that sampling event allowed ThermoRetec to prepare the <i>Pentachlorophenol Hot Spot Removal Work Plan</i> . ThermoRetec estimated approximately 400 cubic yards of soil should be removed.
KPT	April 1999	<i>Excavation Completion Report</i>	July 28, 2000	The Retec Group, Inc.	The document discusses the removal action taken at the KPT facility in April 1999. Approximately 470 cubic yards of surface and subsurface (to 6 feet bgs) soil was removed. Three soil samples were collected from the pit before it was backfilled. One composite sample was collected from the excavated soil before disposal.
Yale Oil	November 2000	None	Data received but no report issued	Maxim Technologies, Inc.	Groundwater samples were collected from GWY-3, GWY-4, GWY-10, GWY-12, GWY-13, and GWY-14 and analyzed for VPH.

TABLE 2-3
SUMMARY OF INVESTIGATIONS AND INTERIM ACTIONS
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Facility	Year at Facility	Investigation Title	Year Published	Contractor	Summary of Investigation Activities
KPT / Reliance / Yale Oil	Various; report discusses previous site investigations	<i>Kalispell Pole & Timber Data Summary Report, Kalispell, Montana: Volume 1 of 2: Report and Appendix A</i>	July 17, 2001	The Retec Group, Inc.	Discusses previous investigations and sampling efforts at the Reliance, the Yale Oil, and the KPT sites.
Reliance	April 2002	<i>Summary of Soil & Groundwater Characterization of the McElroy & Wilken Property, Reliance Refinery Facility</i>	July 2002	Land & Water Consulting, Inc. (LWC)	Two monitoring wells were installed on the Reliance site (GWRR-8 and GWRR-9). Soil samples were collected from three test pits and two surface locations on the McElroy and Wilken property.
Reliance	June & October 2002	<i>Phase II Remedial Investigation/Feasibility Study - Reliance Refinery Facility</i>	December 2002	LWC	Sixteen soil samples were taken from the northern area and three soil samples (for dioxin/furan analysis) were collected from the southern area of the Reliance site. Groundwater samples were collected from wells GWRR-1, GWRR-3, and GWRR-6 in July and October.
Yale Oil	May 2002	None	Data received but no report issued	Hydrometrics, Inc.	Groundwater samples were collected from GWY-3, GWY-4, GWY-10, GWY-12, GWY-13, and GWY-14 and analyzed for VPH.
KPT / Reliance / Yale Oil	February 1999	<i>Semi-Annual Groundwater Monitoring Report</i>	February 1999	The Retec Group, Inc.	Semi-annual groundwater monitoring events. Groundwater level measurements and groundwater samples taken from shallow and deep monitoring wells on the KPT, Reliance, and Yale Oil facilities.
	July 2001	<i>Semi-Annual Groundwater Monitoring Report</i>	July 2001		
	August 2002	<i>Semi-Annual Groundwater Monitoring Report</i>	August 2002		
	April 2003	<i>Semi-Annual Groundwater Monitoring Report</i>	April 2003		
	October 2003	<i>Semi-Annual Groundwater Monitoring Report</i>	October 2003		
	April 2004	<i>Semi-Annual Groundwater Monitoring Report</i>	April 2004		
	October 2004	<i>Semi-Annual Groundwater Monitoring Report</i>	October 2004		
	April 2005	<i>Semi-Annual Groundwater Monitoring Report</i>	April 2005		
KPT	May & September 2004	<i>As Built Report, Full Scale In Situ Ozonation System, Kalispell Pole and Timber, Kalispell, Montana</i>	January 21, 2005	Environmental Resources Management (ERM) West, Inc.	Report outlines the interim action taken to install an in situ ozonation system on the KPT site. Two new monitoring wells were installed (SBM-1 and SBM-2) as well as several ozone injection wells.
Rocky Mountain Marine	April 2005	<i>Site Investigation Relative to Petroleum Hydrocarbon Impact to Subsurface at Rocky Mountain Marine</i>	April 26, 2005	Corwin Environmental Consultants, Inc.	Four borings were excavated on the Rocky Mountain Marine property south of the Yale Oil facility. Eight composite soil samples were collected. Two monitoring wells (MW-01 and MW-02) were installed and groundwater samples were collected. All samples were analyzed for EPH screen.

TABLE 3-1
ADJACENT RESIDENTIAL PROPERTY INVENTORY
KALISPELL POLE and TIMBER, RELIANCE, AND YALE OIL FACILITIES

Owner Name	Property Street Location	Owner Mailing Address		Access	Parcel Size (Acres)
HEIL, SHIRLEY	WHITEFISH STAGE	PO BOX 301	KALISPELL MT599030301	paved road	0.22
GREER, KENNETH E AND GOLDIE		MAIL TO: S & A WEHR	KALISPELL MT599013231	paved road	0.36
SETTLE, STEVEN D	RIVERSIDE DR	269 RIVERSIDE DR	KALISPELL MT599012717	landlocked/none	8.73
PENNOYER DOROTHY-AKA DOROTHY E	RIVERSIDE DR	PO BOX 465	KALISPELL MT599030465	landlocked/none	1.28
GARDNER INVESTMENTS LLC	NICHOLSON DR	PO BOX 958	KALISPELL MT599030958	landlocked/none	0.26
GOODSELL PATRICIA A	NICHOLSON DR	135 NICHOLSON DR	KALISPELL MT599013287	landlocked/none	0.22
HARDY, LOUISE BERTHA & ROBERT	RIVERSIDE DR	255 RIVERSIDE DR	KALISPELL MT599012717	landlocked/none	0.66
WARTNOW RICHARD J	RIVERSIDE	106 RIVERSIDE AVE	KALISPELL MT599012176	landlocked/none	0.27
GILMOND DARIN	NICHOLSON DR	155 NICHOLSON DR	KALISPELL MT599013287	paved road	0.21
MC GRANOR, BLAINE C	FLATHEAD DR	444 FLATHEAD DR	KALISPELL MT599013216	paved road	1.21
NIELSEN NOW WELLER MONA	NICHOLSON DR	139 NICHOLSON DR	KALISPELL MT599013287	semi-improved road	0.24
JOHNSON JOSEPH H & MINTA Y	MONTCLAIR DR	PO BOX 2522	KALISPELL MT599032522	paved road	0.61
VAN LANCKER MICHAEL & CECILIA	RIVERSIDE DR	12 RIVERSIDE DR	KALISPELL MT599012714	paved road	0.08
O'CONNOR JOHN R & CYNTHIA A	NICHOLSON DR	193 NICHOLSON DR	KALISPELL MT599013287	paved road	0.28
RINKES RED HAWK RANCH LLC	MAGSTADT LN	PO BOX 5244	KALISPELL MT599035244	paved road	2.12
BARTHEL FRANZ A	RIVERSIDE DR	PO BOX 34	KALISPELL MT599030034	landlocked/none	0.79
SEAMAN GEORGE & ESTHER	NICHOLSON DR	PO BOX 52	KALISPELL MT599030052	landlocked/none	0.22
BECK, KENNETH E & CLARICE B	RIVER RD	40 RIVER RD	KALISPELL MT599012823	semi-improved road	1.27
AASHEIM, MARILYNN J	PARK ST	407 LOST CREEK DR	KALISPELL MT599016952	landlocked/none	0.32
STANEART, BOBBY NELSON & CASSA		508 FLATHEAD DR	KALISPELL MT599013217	landlocked/none	1.02
BUCK ROBERT J & LYNN M	MAGSTADT LN	PO BOX 10073	KALISPELL MT599043073	landlocked/none	2.19
KERR, ROBERT F & MEDORA	RIVERSIDE AVE	305 RIVERSIDE RD	KALISPELL MT599018261	paved road	20.93
VALENTINE, CONNIE B	RIVERSIDE DR	205 RIVERSIDE DR	KALISPELL MT599012717	landlocked/none	2.90
HOLCOMB RORY SHELDON & RACHEL	MONTCLAIR DRIVE	275 MONTCLAIR DR	KALISPELL MT599013229	paved road	0.83
HAWKS, DARELL D & SHELLIE A	MONTCLAIR	281 MONTCLAIR DR	KALISPELL MT599013229	paved road	0.67
WELLIVER NOW LOWITZ, ADELINE J	MONTCLAIR DR	333 MONTCLAIR DR	KALISPELL MT599013231	paved road	0.25
WILLIAMS RONALD K & ALTA M	PARK ST	75 PARK ST	KALISPELL MT599012710	paved road	1.10
GREER, KENNETH E AND GOLDIE		MAIL TO: S & A WEHR	KALISPELL MT599013231	paved road	0.65
GARDNER TODD	NICHOLSON DRIVE	PO BOX 958	KALISPELL MT599030958	paved road	0.72
INABNIT, BURT & LINDA	NICHOLSON DR	PO BOX 586	KALISPELL MT599030586	landlocked/none	0.33
SAUER, KAREN	NICHOLSON DR	735 CONRAD DR	KALISPELL MT599014631	paved road	0.28
PAULI LYLE W & ZERITA A	NICHOLSON DR	170 NICHOLSON DR	KALISPELL MT599013236	landlocked/none	0.34
CORNELL LIVING TRUST ROBERT L	WHITEFISH STAGE	495 7TH AVENUE EAST N	KALISPELL MT599013726	landlocked/none	0.39
SETTLE, STEVEN D	RIVERSIDE DR	269 RIVERSIDE DR	KALISPELL MT599012717	landlocked/none	2.05
KERR, REBECCA S	RIVERSIDE DR	PO BOX 271	CORTARO AZ856520271	paved road	0.07
PENNOYER DOROTHY-AKA DOROTHY E	RIVERSIDE DR	PO BOX 465	KALISPELL MT599030465	landlocked/none	4.19

TABLE 3-1
ADJACENT RESIDENTIAL PROPERTY INVENTORY
KALISPELL POLE and TIMBER, RELIANCE, AND YALE OIL FACILITIES

Owner Name	Property Street Location	Owner Mailing Address			Access	Parcel Size (Acres)
BRABHAM, JOSEPH A & PAULINA G	NICHOLSON DR	95 NICHOLSON DR	KALISPELL	MT599013233	paved road	0.35
MC GUIRE, KENNETH L & ALTHEA A	NICHOLSON DR	173 NICHOLSON DR	KALISPELL	MT599013287	paved road	0.30
COLLINS, WILLIAM J	MAGSTADT LANE	17 MAGSTADT LN	KALISPELL	MT599013228	landlocked/none	0.26
JOHNSON JOSEPH H & MINTA Y	MONTCLAIR DR	PO BOX 2522	KALISPELL	MT599032522	paved road	0.30
GEMMER MARTIN W & CONNIE J	MONTCLAIR DR	321 MONTCLAIR DR	KALISPELL	MT599013231	paved road	0.74
GIPE HOWARD W	MONTCLAIR DR	181 MONTCLAIR DR	KALISPELL	MT599013276	landlocked/none	2.05
HAGESTAD, EDWARD M & PATRICIA	PARK ST	PO BOX 7111	KALISPELL	MT599040111	landlocked/none	0.55
HAYEN, STEWART D	WHITEFISH STAGE	PO BOX 2705	KALISPELL	MT599032705	paved road	0.58
ATHERTON JOYCE ANN	NICHOLSON DR	PO BOX 2308	KALISPELL	MT599032308	landlocked/none	0.22
BRABHAM, JOSEPH A & PAULINA G	NICHOLSON DR	95 NICHOLSON DR	KALISPELL	MT599013233	paved road	0.19
WARREN KAREN R	MAGSTADT LANE	19 MAGSTADT LN	KALISPELL	MT599013228	paved road	0.27
WELLIVER NOW LOWITZ, ADELINE J	MONTCLAIR DR	333 MONTCLAIR DR	KALISPELL	MT599013231	paved road	0.81
MAY MICHAEL E & ANDREA	NICHOLSON DR	429 NOTTINGHAM DR	REDLANDS	CA923735762	landlocked/none	0.23
HAWKS, DARELL D & SHELLIE A	MONTCLAIR	281 MONTCLAIR DR	KALISPELL	MT599013229	paved road	0.17
KERR, REBECCA S	RIVERSIDE DR	PO BOX 271	CORTARO	AZ856520271	paved road	2.16
WARTNOW RICHARD J	RIVERSIDE	106 RIVERSIDE AVE	KALISPELL	MT599012176	landlocked/none	0.10
HARRIMAN EARL G & TAOMO M	NICHOLSON DR	AD% R A CORRIGEUX	KALISPELL	MT599013287	landlocked/none	0.26
BARGE GARY LEE	PARK ST	102 RIVERSIDE DR	KALISPELL	MT599012716	landlocked/none	0.12
RENNEBERG, MARGARET E	PARK ST	83 PARK ST	KALISPELL	MT599012710	paved road	0.07
HARDY, LOUISE BERTHA & ROBERT	RIVERSIDE DR	255 RIVERSIDE DR	KALISPELL	MT599012717	landlocked/none	0.11
HARDY, LOUISE BERTHA & ROBERT	RIVERSIDE DR	255 RIVERSIDE DR	KALISPELL	MT599012717	landlocked/none	0.04
HARDY, LOUISE BERTHA & ROBERT	RIVERSIDE DR	255 RIVERSIDE DR	KALISPELL	MT599012717	landlocked/none	0.35
MOON KIMBERLY K	FLATHEAD DR	16 RIVERSIDE DR	KALISPELL	MT599012714	paved road	0.13
CROPSEY DONALD M AKA DONALD MY	NICHOLSON DR	175 NICHOLSON DR	KALISPELL	MT599013287	paved road	0.27
DONOVAN DAVID J	PARK ST	81 PARK ST	KALISPELL	MT599012710	landlocked/none	1.19
MEYER, LINDA J	NICHOLSON DR	180 NICHOLSON DR	KALISPELL	MT599013236	landlocked/none	0.29
CORDELL M GENE	FLATHEAD DRIVE	500 FLATHEAD DR	KALISPELL	MT599013217	landlocked/none	1.16
BARE MICHAEL J & MARIE	RIVERSIDE DR	122 RIVERSIDE DR	KALISPELL	MT599012716	landlocked/none	1.23
PENNOYER DOROTHY-AKA DOROTHY E	RIVERSIDE DR	PO BOX 465	KALISPELL	MT599030465	landlocked/none	0.15
EMERSON, CLIFFORD A	MONTCLAIR DR	345 MONTCLAIR DR	KALISPELL	MT599013231	paved road	0.86
CORPRON, SHANE & SANDY	PARK ST	89 PARK ST	KALISPELL	MT599012710	landlocked/none	2.08
NORTON RAMONA L AKA RAMONA	NICHOLSON DR	468 7TH AVENUE EAST N	KALISPELL	MT599013727	paved road	0.22
HILL, WAYNE L	HWY 2 E	357 MONTCLAIR DR	KALISPELL	MT599013231	landlocked/none	0.49
CORNELL LIVING TRUST ROBERT L	WHITEFISH STAGE	495 7TH AVENUE EAST N	KALISPELL	MT599013726	landlocked/none	0.12
RENNEBERG, MARGARET E	PARK ST	83 PARK ST	KALISPELL	MT599012710	paved road	0.12
RINKES RED HAWK RANCH LLC	MAGSTADT LN	28 MAGSTADT LN	KALISPELL	MT599013228	landlocked/none	1.99
TORGERSON DEBRA K	FLATHEAD DR	AD% DEBRA K HANSON	KALISPELL	MT599013216	landlocked/none	0.63
PENNOYER DOROTHY-AKA DOROTHY E	RIVERSIDE DR	PO BOX 465	KALISPELL	MT599030465	landlocked/none	1.21

TABLE 3-1
ADJACENT RESIDENTIAL PROPERTY INVENTORY
KALISPELL POLE and TIMBER, RELIANCE, AND YALE OIL FACILITIES

Owner Name	Property Street Location	Owner Mailing Address		Access	Parcel Size (Acres)
BEACH SYLVIA M	NICHOLSON DR	163 NICHOLSON DR	KALISPELL MT599013287	landlocked/none	0.19
HARTMAN, KELLY D & MARILYN R	MAGSTADT LANE	AD% ROBERT J RINKE	KALISPELL MT599035244	paved road	2.10
MELLEM RONALD D	NICHOLSON DR	167 NICHOLSON DR	KALISPELL MT599013287	landlocked/none	0.56
T & R HALL LLC	NICHOLSON DR	409 1ST AVE E	KALISPELL MT599014918	landlocked/none	0.21
BRABHAM, JOSEPH A & PAULINA G	NICHOLSON DR	95 NICHOLSON DR	KALISPELL MT599013233	paved road	0.21
KIDWELL RICHARD C & DONNA MARI	NICHOLSON DR	111 NICHOLSON DR	KALISPELL MT599013235	landlocked/none	0.49
KERR, ROBERT F & MEDORA	RIVERSIDE AVE	305 RIVERSIDE RD	KALISPELL MT599018261	paved road	0.23
BARTHEL, FRANZ	PARK ST	PO BOX 34	KALISPELL MT599030034	landlocked/none	0.12
VALENTINE, CONNIE B	RIVERSIDE DR	205 RIVERSIDE DR	KALISPELL MT599012717	landlocked/none	1.49
EMERSON, CLIFFORD A	MONTCLAIR DR	345 MONTCLAIR DR	KALISPELL MT599013231	paved road	0.22
ROWLAN, STEPHEN S & GUDRUN VIO		PO BOX 2847	KALISPELL MT599032847	landlocked/none	1.38
PAULI LYLE W & ZERITA A	NICHOLSON DR	170 NICHOLSON DR	KALISPELL MT599013236	landlocked/none	0.30
VALENTINE, CONNIE B	RIVERSIDE DR	205 RIVERSIDE DR	KALISPELL MT599012717	landlocked/none	0.36
GEMMER MARTIN W & CONNIE J	MONTCLAIR DR	321 MONTCLAIR DR	KALISPELL MT599013231	paved road	0.28
ERICKSON LOUISE E	BROWNS MEADOW R	259 RIVERSIDE DR	KALISPELL MT599012717	paved road	1.01

TABLE 3-2
FLOW STATISTICS FOR STREAMS IN THE KALISPELL VALLEY, MONTANA

Station Number	Station Name	Drainage Area (sq/mi)	Type of Data Collected	Period of Record (Calendar Year)	Discharge for Period of Record				
					Mean Annual (ft ³ /s)	Maximum (ft ³ /s)	Date of Maximum	Minimum (ft ³ /s)	Date of Minimum
12363000	Flathead River at Columbia Falls	4,464	c, d, m, s, t	1922-23, 1928-	9,626	176,000	06-06-64	798	12-08-29
12363500	Flathead River near Kalispell	--	c	1968-69	--	--	--	--	--
12365500	Stillwater River near Kalispell	537 ¹	d	1907, 1922, 1928-31	192 ²	2,750	05-22-22	26	11-11-29
12366000	Whitefish River near Kalispell	170	d	1928, 1929-1950, 1963-64, 1986-	190	1,580	06-24-74	4.5	10-18-34
12367500	Ashley Creek near Kalispell	195	c, d	1931-50, 1969-70, 1972-74	30.8	749	05-27-48	0	At times

Notes:

1 Corrected from U.S. Geological Survey Water-Supply Paper 1316 (1955)

2 Data for water year 1930

c Water chemistry (select common ions and nutrients)

d Discharge

m Microbiological

s Suspended sediment

t Temperature

ft³/s Cubic feet per second

-- No data

Periods of record for stations that were being operated at least up to November 1994 are indicated by the first year of record followed by a dash only.

TABLE 3-3

HYDRAULIC CHARACTERISTICS OF SELECTED AQUIFERS IN THE KALISPELL VALLEY, MONTANA

Aquifer Description ^b	Specific Yield or Storage Coefficient	Thickness (feet)	Transmissivity (ft ² /day)	Specific Capacity (gal/min per ft)	Yield to Wells (gal/min)
Holocene deltaic sand south of Kalispell	0.27 ^a	100-200 ^a	1,000 ^b 1.1-3,700 ^a	--	--
Holocene alluvial gravel north of Kalispell	0.2 ^b	28 average ^b 28-30 ^a	150,000 average ^b 120,000-240,000 ^a	260-640 ^b	More than 1,500 ^b
Pleistocene perched glacial outwash northwest of Kalispell	--	70 ^b	76,000 ^b	6-92 ^b	70-200 ^b
Pleistocene confined glacial outwash underlying entire basin	0.00087 ^b	More than 364 ^b	48-510 ^b	0.04-32 ^b	1-1,500 pumped ^a , 1-225 flowing
Precambrian bedrock	0.0000153 ^c 0.003-0.3 ^d	--	4,650-8,130 ^c 1,600 ^d	0.2 average ^b 0.1-2.0 ^e	9 average ^b 10-50 ^e

Notes:

- a Noble and Stanford (1986)
 b Konizeski and others (1968)
 c Spratt and Associates (1990)
 d Newman (1981), as cited in Spratt and Associates (1990)
 e Dutton and others (1995)
 ft²/d foot squared per day
 gal/min per ft gallon per minute per foot
 gal/min gallon per minute
 -- No data

TABLE 3-4
SITE WELL INFORMATION
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Well	Alternate Name	Site	Status	Measuring Point Elevation (ft amsl)	Measuring Point	Well Diameter (inches)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Well Depth (ft bgs)	Installation Date	Ground Elevation (ft amsl)
GWY-1	MW-1; YR-GW-4	Yale Oil	Abandoned (1992)	---	---	4.0	10.0	30.0	30.0	08/1985	---
GWY-2	MW-2	Yale Oil	Abandoned (1992)	---	---	4.0	10.0	30.0	30.0	08/1985	---
GWY-3	MW-3; YR-GW-3	Yale Oil	Existing	2929.79	Top of PVC	4.0	10.0	30.0	30.0	08/1985	---
GWY-4	MW-4; YR-GW-2	Yale Oil	Existing	2930.46	Top of PVC	4.0	10.0	30.0	30.0	08/1985	---
GWY-5	W-5	Yale Oil	Abandoned (1992)	---	---	---	---	---	---	---	---
GWY-6	W-6	Yale Oil	Not Found	---	---	---	---	---	---	---	---
GWY-7	MW-7	Yale Oil	Not Found	---	---	4.0	10.0	30.0	30.0	09/1985	---
GWY-8	MW-8	Yale Oil	Not Found	---	---	4.0	10.0	30.0	30.0	09/1985	---
GWY-9	MW-9; YR-GW-5	Yale Oil	Not Found	---	---	4.0	10.0	30.0	30.0	09/1985	---
GWY-10	MW-10	Yale Oil	Existing	2930.08	Top of PVC	4.0	10.0	30.0	30.0	09/1985	2928.29
GWY-11	MW-11	Yale Oil	Not Found	---	---	4.0	10.0	30.0	30.0	09/1985	---
GWY-12	MW-12; YR-GW-1	Yale Oil	Existing	2929.43	Top of PVC	4.0	10.0	30.0	30.0	09/1985	2928.29
GWY-13	MW-13	Yale Oil	Existing	2929.08	Top of PVC	4.0	10.0	30.0	30.0	09/1985	---
GWY-14	MW-14	Yale Oil	Existing	2928.95	Top of PVC	4.0	10.0	30.0	30.0	09/1985	2928.29
GWY-15	MW-15	Yale Oil	Abandoned (1992)	---	---	4.0	5.0	15.0	15.0	04/1986	---
GWY-16	MW-16	Yale Oil	Abandoned (1992)	---	---	4.0	9.0	24.5	25.0	04/1986	---
GWY-17	MW-17	Yale Oil	Abandoned (1992)	---	---	4.0	6.0	17.5	18.0	04/1986	---
CLCW-1	None	Yale Oil	Existing	2931.38	Top of Casing	---	---	---	---	---	---
GWRR-1	RR-MW-1	Reliance	Existing	2928.67	Top of PVC	2.0	11.9	21.9	24.0	2/25/1986	---
GWRR-2	RR-MW-2	Reliance	Existing	2928.93	Top of PVC	2.0	12.85	22.85	25.0	2/27/1986	---
GWRR-3	RR-MW-3	Reliance	Existing	2925.17	Top of PVC	2.0	8.65	18.65	20.0	2/26/1986	---
GWRR-4	None	Reliance	Existing	2928.20	Top of PVC	2.0	4.75	14.75	20.0	4/8/1996	---
GWRR-5	None	Reliance	Existing	2928.88	Top of PVC	2.0	13.0	23.0	23.3	4/9/1996	---
GWRR-6	None	Reliance	Existing	2926.75	Top of PVC	2.0	4.75	14.75	25.0	4/9/1996	---
GWRR-7	None	Reliance	Existing	2927.53	Top of PVC	2.0	6.25	16.25	16.5	4/10/1996	---
GWRR-8	None	Reliance	Existing	---	---	2.0	20.5	30.5	32.0	4/23/2002	---
GWRR-9	None	Reliance	Existing	---	---	2.0	16.0	26.0	28.0	4/23/2002	---
KPT-17	None	Reliance	Need Field Verification	---	---	---	---	---	---	---	---
KPT-18	None	Reliance	Need Field Verification	---	---	---	---	---	---	---	---
PRW-1	Product Recovery Well 1	Reliance	Existing	---	---	12.0	2.0	12.0	12.0	8/2002	---
PRW-2	Product Recovery Well 2	Reliance	Existing	---	---	12.0	2.0	12.0	12.0	8/2002	---
GW-1	None	KPT	Existing	2930.29	Top of PVC	4.0	11.9	21.9	24.0	10/31/1988	---
GW-2	None	KPT	Abandoned (1995)	---	---	4.0	13.0	23.0	24.0	10/30/1988	---

TABLE 3-4
SITE WELL INFORMATION
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Well	Alternate Name	Site	Status	Measuring Point Elevation (ft amsl)	Measuring Point	Well Diameter (inches)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Well Depth (ft bgs)	Installation Date	Ground Elevation (ft amsl)
GW-3	KPT-MW-3	KPT	Abandoned (1995)	---	---	4.0	11.8	21.8	23.0	10/29/1988	---
GW-4	KPT-MW-4	KPT	Abandoned (1995)	---	---	4.0	108.0	118.0	137.0	2/17/1989	---
GW-5	KPT-MW-5	KPT	Existing	2930.80	Top of PVC	4.0	14.0	24.0	24.5	12/17/1989	---
IW-1	None	KPT	Need Field Verification	---	---	---	---	---	---	---	---
IW-2	None	KPT	Need Field Verification	---	---	---	---	---	---	---	---
IW-3	None	KPT	Need Field Verification	---	---	---	---	---	---	---	---
IW-4	None	KPT	Need Field Verification	---	---	---	---	---	---	---	---
IW-5	None	KPT	Need Field Verification	---	---	---	---	---	---	---	---
IW-6	None	KPT	Need Field Verification	---	---	---	---	---	---	---	---
IW-7	None	KPT	Need Field Verification	---	---	---	---	---	---	---	---
IW-8	None	KPT	Need Field Verification	---	---	---	---	---	---	---	---
KPT-1	None	KPT	Existing	2936.28	Top of PVC	4.0	13.0	28.0	29.0	10/29/1994	2934.12
KPT-2	None	KPT	Existing	2935.89	Top of Steel	4.0	13.0	28.0	29.0	10/27/1994	2932.78
KPT-3	None	KPT	Existing	2933.54	Top of PVC	4.0	13.0	28.0	29.0	10/28/1994	2931.66
KPT-4	None	KPT	Existing	2931.84	Top of PVC	4.0	13.0	28.0	29.0	10/28/1994	2929.61
KPT-5	None	KPT	Existing	2931.04	Top of PVC	4.0	13.0	28.0	29.0	10/28/1994	2928.99
KPT-6	None	KPT	Existing	2932.63	Top of PVC	4.0	13.0	28.0	29.0	10/27/1994	2930.15
KPT-7	None	KPT	Existing	2931.74	Top of PVC	4.0	12.5	27.5	28.5	10/29/1994	2928.86
KPT-8	None	KPT	Existing	2931.46	Top of PVC	4.0	110.0	120.0	122.0	10/28/1994	2929.33
KPT-9	None	KPT	Existing	2923.84	Top of Steel	4.0	6.0	16.0	23.0	9/6/1996	2921.47
KPT-10	None	KPT	Existing	2921.96	Top of PVC	4.0	8.0	23.0	27.0	11/18/1996	2920.06
KPT-11	None	KPT	Existing	2923.62	Top of PVC	2.0	52.0	72.0	74.0	11/15/1996	2921.92
KPT-12	None	KPT	Existing	2935.79	Top of PVC	4.0	14.0	24.0	24.5	9/6/1996	2934.03
KPT-13	None	KPT	Existing	2923.86	Top of PVC	2.0	109.0	119.0	120.0	11/14/1996	2921.77
KPT-14	None	KPT	Existing	2922.45	Top of PVC	2.0	96.0	106.0	109.0	11/20/1996	2920.69
KPT-15	None	KPT	Existing	2931.12	Top of PVC	2.0	101.0	111.0	117.0	11/21/1996	2929.28
KPT-16	None	KPT	Existing	2931.93	Top of PVC	2.0	14.0	29.0	29.5	4/7/1999	---
KPT-19	None	KPT	Need Field Verification	---	---	---	---	---	---	---	---
KPT-20	None	KPT	Need Field Verification	---	---	---	---	---	---	---	---
KPT-21	None	KPT	Need Field Verification	---	---	---	---	---	---	---	---
OSW-1	None	KPT	Existing	2932.50	Top of Steel	4.0	11.0	26.0	26.0	9/3/1996	2930.36
OSW-2	None	KPT	Existing	2932.01	Top of Steel	4.0	11.0	26.0	26.0	9/5/1996	2929.95
OMW-1	None	KPT	Existing	2925.55	Top of PVC	2.0	12.0	27.0	27.5	4/7/1999	---

TABLE 3-4
SITE WELL INFORMATION
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Well	Alternate Name	Site	Status	Measuring Point Elevation (ft amsl)	Measuring Point	Well Diameter (inches)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Well Depth (ft bgs)	Installation Date	Ground Elevation (ft amsl)
OMW-2	None	KPT	Existing	2931.09	Top of PVC	2.0	12.0	27.0	27.5	4/7/1999	---
OMW-3	None	KPT	Existing	2923.82	Top of PVC	2.0	12.0	27.0	27.5	4/7/1999	---
OMW-4	None	KPT	Existing	2931.36	Top of PVC	2.0	12.0	27.0	27.5	4/7/1999	---
OMW-5	None	KPT	Existing	---	---	---	---	---	---	---	---
OMW-6	None	KPT	Existing	---	---	---	---	---	---	---	---
SBM-1	None	KPT	Existing	2936.23	Top of Casing	4.0	17.0	28.0	30.6	5/11/2004	---
SBM-2	None	KPT	Existing	2936.68	Top of Casing	4.0	17.0	28.0	30.2	5/11/2004	---
EH-1	None	Wal-Mart	Existing	2910.17	Top of Casing	2.0	3.0	11.0	12.5	1/13/1992	2907.83
EH-2	None	Wal-Mart	Not Found	2921.16	Top of Casing	2.0	8.0	18.0	19.5	1/14/1992	2918.49
EH-3	None	Wal-Mart	Existing	2918.74	Top of Casing	2.0	6.0	16.0	17.5	1/14/1992	2915.80
SW-5	None	Wal-Mart	Not Found	2930.36	Top of Casing	4.0	20.0	40.0	40.0	6/18/1992	2930.44
SW-6	None	Wal-Mart	Not Found	2927.91	Top of Casing	4.0	17.0	37.0	37.0	6/19/1992	2928.11
SW-7	None	Wal-Mart	Not Found	2921.52	Top of Casing	4.0	12.0	32.0	35.0	6/19/1992	2921.55
SW-8	None	Wal-Mart	Existing	2920.53	Top of Casing	2.0	9.5	19.6	20.0	7/1/1992	2918.13
SW-9	None	Wal-Mart	Existing	2920.27	Top of Casing	2.0	---	---	---	---	2917.55
SW-10	None	Wal-Mart	Existing	2922.94	Top of Casing	2.0	7.0	17.0	20.0	7/1/1992	2920.88
SW-11	None	Wal-Mart	Existing	2925.29	Top of Casing	2.0	7.0	17.0	20.0	7/2/1992	2924.30
SW-12	None	Wal-Mart	Existing	2919.41	Top of Casing	2.0	7.0	17.0	20.0	7/2/1992	2917.71
PW-1	None	Wal-Mart	Existing	2924.71	---	2.0	14.5	24.6	25.0	3/22/1993	2925.25
PW-2C	None	Wal-Mart	Existing	2924.58	---	2.0	15.0	25.0	25.0	3/23/1993	2925.07
PW-2D	None	Wal-Mart	Existing	2924.47	---	2.0	12.0	22.0	22.0	3/23/1993	2925.02
PW-3	None	Wal-Mart	Existing	2922.55	---	2.0	12.0	22.0	22.0	3/24/1993	2922.84
NW-1	None	Wal-Mart	Existing	---	---	2.0	10.0	30.0	30.5	9/29/1994	---
NW-2	None	Wal-Mart	Existing	---	---	2.0	11.5	26.5	26.9	9/26/1994	---
NW-3	None	Wal-Mart	Not Found	---	---	2.0	12.0	27.0	27.4	9/26/1994	---
NW-4	None	Wal-Mart	Existing	---	---	2.0	12.2	32.2	33.0	9/28/1994	---
GWRM-1	MW-01 (BH#2)	Rocky Mountain Marine	Existing	---	---	2.0	15.0	25.0	25.0	4/14/2005	---
GWRM-1	MW-02 (BH#4)	Rocky Mountain Marine	Existing	---	---	2.0	15.0	25.0	25.0	4/14/2005	---
PWS-1	RR-GW-2, EW-1	130 Nicholson Drive	Existing	---	---	---	---	---	120.0	---	---
RW-1	Benson, RR-GW-1	460 Flathead Drive	Need Field Verification	---	---	---	---	---	38.0	---	---
RW-2	Rask; KPT-RW-2	450 Flathead Drive	Need Field Verification	---	---	---	---	---	74.0	28300.00	---
RW-3	Jenkins	275 Montclair Drive	Need Field Verification	---	---	---	---	---	50.0	---	---
RW-4	Haugness, Brabham	95 Nicholson Drive	Need Field Verification	---	---	---	---	---	21.0	---	---

TABLE 3-4
SITE WELL INFORMATION
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Well	Alternate Name	Site	Status	Measuring Point Elevation (ft amsl)	Measuring Point	Well Diameter (inches)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Well Depth (ft bgs)	Installation Date	Ground Elevation (ft amsl)
RW-5	Seaman	1028 East Idaho	Need Field Verification	---	---	---	---	---	25.0	---	---
RW-6	Nelson	Nicholson Drive	Need Field Verification	---	---	---	---	---	17.0	---	---
RW-7	Pennoyer	438 Flathead Drive	Need Field Verification	---	---	---	---	---	70.0	12/30/1963	---
RW-8	Batco, Mtn Springs Hot Tub	125 Flathead Drive	Need Field Verification	---	---	---	---	---	---	---	---
RW-9	Gipe	181 Montclair Drive	Need Field Verification	---	---	---	---	---	29.0	---	---
RW-10	Rowlan	444 Flathead Drive	Need Field Verification	---	---	---	---	---	---	---	---
RW-11	Welliver	333 Montclair Drive	Need Field Verification	---	---	---	---	---	---	---	---
RW-12 ^A	Cameron	Address Not Located	Need Field Verification	---	---	---	---	---	---	---	---
RW-13 ^A	Hughs	Address Not Located	Need Field Verification	---	---	---	---	---	---	---	---
RW-14 ^A	Strunk	Address Not Located	Need Field Verification	---	---	---	---	---	---	---	---

Notes:

^A Well designation may change after field verification (once address is determined)

'---' Denotes unknown well information

ft bgs Feet below ground surface

ft amsl Feet above mean sea level

KPT Kalispell Pole & Timber

TABLE 4-1
STATISTICAL SUMMARY OF HISTORIC GROUNDWATER ANALYTICAL RESULTS

ANALYTE GROUP	ANALYTE	CONVERTED UNITS	Number of Samples	Number of Detects	Min Detect	Max Detect	WQB-7 HH GROUNDWATER (UG/L) ¹	RBCA GROUNDWATER (UG/L)	EPA SECONDARY MCL (UG/L)
CHLORINATED HERBICIDE	PICLORAM	UG/L	47	1	8.2	8.2	500		
DIOXIN/FURAN	1,2,3,4,6,7,8,9-OCDD	PG/L	46	43	11.2	16000000			
DIOXIN/FURAN	1,2,3,4,6,7,8,9-OCDF	PG/L	46	28	25	890000			
DIOXIN/FURAN	1,2,3,4,6,7,8-HPCDD	PG/L	40	35	25	4600000			
DIOXIN/FURAN	1,2,3,4,6,7,8-HPCDF	PG/L	40	30	4.8	620000			
DIOXIN/FURAN	1,2,3,4,7,8,9-HPCDF	PG/L	40	11	6.1	34000			
DIOXIN/FURAN	1,2,3,4,7,8-HXCDD	PG/L	40	8	12.5	3400			
DIOXIN/FURAN	1,2,3,4,7,8-HXCDF	PG/L	40	15	5.4	62000			
DIOXIN/FURAN	1,2,3,6,7,8-HXCDD	PG/L	40	24	15	360000			
DIOXIN/FURAN	1,2,3,6,7,8-HXCDF	PG/L	40	10	2.7	19000			
DIOXIN/FURAN	1,2,3,7,8,9-HXCDD	PG/L	40	11	14	25000			
DIOXIN/FURAN	1,2,3,7,8,9-HXCDF	PG/L	40	11	13	40000			
DIOXIN/FURAN	1,2,3,7,8-PECDD	PG/L	40	7	5.4	1900			
DIOXIN/FURAN	1,2,3,7,8-PECDF	PG/L	40	18	7.6	240000			
DIOXIN/FURAN	2,3,4,6,7,8-HXCDF	PG/L	40	10	13	34000			
DIOXIN/FURAN	2,3,4,7,8-PECDF	PG/L	40	9	57	79000			
DIOXIN/FURAN	2,3,7,8-TCDD	PG/L	40	4	2.5	25			
DIOXIN/FURAN	2,3,7,8-TCDF	PG/L	40	11	2.2	70000			
DIOXIN/FURAN	EPA TEF	PG/L	40	40	2.039	166355.5	2.0		
DIOXIN/FURAN	WHO TEF	PG/L	40	40	2.389	167305.5	2.0		
METAL	ALUMINUM	UG/L	19	3	13	55			50
METAL	ARSENIC	UG/L	23	3	2.8	34	20		
METAL	BARIUM	UG/L	29	29	0.16	686	2000		
METAL	BERYLLIUM	UG/L	19	7	2	3	4.0		
METAL	CADMIUM	UG/L	29	1	0.2	0.2	5.0		
METAL	CALCIUM	UG/L	19	18	43880	151100			
METAL	CHROMIUM	UG/L	29	7	1.2	5			
METAL	COBALT	UG/L	19	7	5	23			
METAL	COPPER	UG/L	19	7	3	26	1300		1000
METAL	IRON	UG/L	19	17	3	6576			300
METAL	LEAD	UG/L	30	9	0.5	20	15		
METAL	MAGNESIUM	UG/L	19	19	10000	76100			
METAL	MANGANESE	UG/L	19	18	2	5267			50
METAL	MERCURY	UG/L	29	2	0.2	0.5	2.0		
METAL	POTASSIUM	UG/L	19	11	827	92400			
METAL	SODIUM	UG/L	19	19	2252	44360			
METAL	THALLIUM	UG/L	13	4	0.5	0.8	2.0		
METAL	VANADIUM	UG/L	19	7	1.9	40			
METAL	ZINC	UG/L	19	15	3.8	50	2000		500
PCP ONLY	PENTACHLOROPHENOL	UG/L	477	279	0.068	220000	1.0		
PCP ONLY	PENTACHLOROPHENOL, NP	UG/L	9	7	0.46	370	1.0		
PESTICIDE	2-(2, 4, 5-TRICHLOROPHENOXY) PROPIONIC ACID	UG/L	37	2	1.9	2.1			
PESTICIDE	DCPA	UG/L	11	1	1.4	1.4			
PETROLEUM HYDROCARBON	C11-C22 AROMATICS	UG/L	36	30	2.6	58000		300	
PETROLEUM HYDROCARBON	C19-C36 ALIPHATICS	UG/L	36	24	2.1	18000		1000	
PETROLEUM HYDROCARBON	C5-C8 ALIPHATICS	UG/L	14	1	198	198		400	
PETROLEUM HYDROCARBON	C9-C10 AROMATICS	UG/L	13	3	108	1100		50	
PETROLEUM HYDROCARBON	C9-C12 ALIPHATICS	UG/L	14	1	1080	1080		400	
PETROLEUM HYDROCARBON	C9-C18 ALIPHATICS	UG/L	36	28	3.5	35000		400	
PETROLEUM HYDROCARBON	DIESEL	UG/L	9	1	14000	14000			
PETROLEUM HYDROCARBON	DIESEL RANGE ORGANICS	UG/L	57	34	0.29	940000			

TABLE 4-1
STATISTICAL SUMMARY OF HISTORIC GROUNDWATER ANALYTICAL RESULTS

ANALYTE GROUP	ANALYTE	CONVERTED UNITS	Number of Samples	Number of Detects	Min Detect	Max Detect	WQB-7 HH GROUNDWATER (UG/L) ¹	RBCA GROUNDWATER (UG/L)	EPA SECONDARY MCL (UG/L)
PETROLEUM HYDROCARBON	DIESEL RANGE ORGANICS AS DIESEL	UG/L	66	37	0.406	2100000			
PETROLEUM HYDROCARBON	DIESEL RANGE ORGANICS AS MOTOR OIL	UG/L	5	1	760	760			
PETROLEUM HYDROCARBON	EPH SCREEN	UG/L	13	9	710	43000			
PETROLEUM HYDROCARBON	EXTRACTABLE HYDROCARBONS	UG/L	2	2	58.2	9050			
PETROLEUM HYDROCARBON	GASOLINE RANGE ORGANICS	UG/L	64	47	20	30200			
PETROLEUM HYDROCARBON	GASOLINE RANGE ORGANICS AS GASOLINE	UG/L	59	43	20	30200			
PETROLEUM HYDROCARBON	TOTAL EXTRACTABLE HYDROCARBONS	UG/L	64	37	0.593	959000			
PETROLEUM HYDROCARBON	TOTAL PETROLEUM HYDROCARBON	UG/L	4	1	17700	17700			
PETROLEUM HYDROCARBON	TOTAL PETROLEUM HYDROCARBONS	UG/L	37	23	200	110000			
PETROLEUM HYDROCARBON	TOTAL PURGEABLE HYDROCARBONS	UG/L	60	45	22	1290000			
PETROLEUM HYDROCARBON	TPH AS DIESEL BY GC-FID	UG/L	20	20	1.9	67000			
PETROLEUM HYDROCARBON	TPH AS GASOLINE BY GC	UG/L	23	5	84	3700			
SVOC	1,2,4-TRICHLOROBENZENE	UG/L	154	8	10	10	70		
SVOC	1,2-DICHLOROBENZENE	UG/L	167	8	10	20	600		
SVOC	1,3-DICHLOROBENZENE	UG/L	167	8	10	10	400		
SVOC	1,4-DICHLOROBENZENE	UG/L	172	13	10	40	75		
SVOC	1-METHYLNAPHTHALENE	UG/L	36	22	0.061	30			
SVOC	2,3,4,5-TETRACHLOROPHENOL	UG/L	88	50	0.15	4.4			
SVOC	2,3,4,6-TETRACHLOROPHENOL	UG/L	48	26	0.53	170			
SVOC	2,3,4-TRICHLOROPHENOL	UG/L	90	8	0.13	0.93			
SVOC	2,3,5,6-TETRACHLOROPHENOL	UG/L	54	32	0.16	270			
SVOC	2,3,6-TRICHLOROPHENOL	UG/L	84	1	0.31	0.31			
SVOC	2,4,5-TRICHLOROPHENOL	UG/L	213	39	0.24	63	7.0		
SVOC	2,4,6-TRICHLOROPHENOL	UG/L	234	35	0.11	130	30		
SVOC	2,4-DICHLOROPHENOL	UG/L	125	10	1	16	93		
SVOC	2,4-DIMETHYLPHENOL	UG/L	125	9	2	50	540		
SVOC	2,4-DINITROPHENOL	UG/L	121	8	10	50	70		
SVOC	2,4-DINITROTOLUENE	UG/L	117	10	10	4000	0.50		
SVOC	2,6-DINITROTOLUENE	UG/L	117	8	10	10	0.50		
SVOC	2-CHLORONAPHTHALENE	UG/L	137	18	0.055	10			
SVOC	2-CHLOROPHENOL	UG/L	139	8	10	10	120		
SVOC	2-METHYLNAPHTHALENE	UG/L	146	42	0.045	120000			
SVOC	2-METHYLPHENOL	UG/L	109	10	1	200			
SVOC	2-NITROANILINE	UG/L	103	8	50	50			
SVOC	2-NITROPHENOL	UG/L	112	8	10	10			
SVOC	3,3'-DICHLOROBENZIDINE	UG/L	114	8	20	20	0.40		
SVOC	3-NITROANILINE	UG/L	99	8	50	50			
SVOC	4,6-DINITRO-2-METHYLPHENOL	UG/L	112	8	50	50			
SVOC	4-BROMOPHENYL-PHENYLETHER	UG/L	117	8	10	10			
SVOC	4-CHLORO-3-METHYLPHENOL	UG/L	139	8	10	20			
SVOC	4-CHLOROANILINE	UG/L	103	8	10	20			
SVOC	4-CHLOROPHENYL-PHENYLETHER	UG/L	80	8	10	10			
SVOC	4-METHYLPHENOL	UG/L	100	12	1	42			
SVOC	4-NITROANILINE	UG/L	103	9	50	4400			
SVOC	4-NITROPHENOL	UG/L	112	10	6	500	60		
SVOC	ACENAPHTHENE	UG/L	164	37	0.065	24640	420	420	
SVOC	ACENAPHTHYLENE	UG/L	133	15	0.11	14000			
SVOC	ANTHRACENE	UG/L	155	19	0.045	4500	2100	2100	
SVOC	BENZO(A)ANTHRACENE	UG/L	171	20	0.058	557	0.48	0.48	
SVOC	BENZO(A)PYRENE	UG/L	176	9	10	711	0.048	0.048	
SVOC	BENZO(B)FLUORANTHENE	UG/L	162	17	0.042	2257	0.48	0.48	

**TABLE 4-1
STATISTICAL SUMMARY OF HISTORIC GROUNDWATER ANALYTICAL RESULTS**

ANALYTE GROUP	ANALYTE	CONVERTED UNITS	Number of Samples	Number of Detects	Min Detect	Max Detect	WQB-7 HH GROUNDWATER (UG/L) ¹	RBCA GROUNDWATER (UG/L)	EPA SECONDARY MCL (UG/L)
SVOC	BENZO(E)PYRENE	UG/L	20	7	0.066	0.14			
SVOC	BENZO(G,H,I)PERYLENE	UG/L	155	9	0.062	10			
SVOC	BENZO(K)FLUORANTHENE	UG/L	153	9	0.043	10	4.79	4.79	
SVOC	BENZOIC ACID	UG/L	103	10	1	430			
SVOC	BENZYL ALCOHOL	UG/L	103	9	2	10			
SVOC	BIS(2-CHLOROETHOXY)METHANE	UG/L	117	8	10	10			
SVOC	BIS(2-CHLOROETHYL)ETHER	UG/L	117	8	10	10			
SVOC	BIS(2-CHLOROISOPROPYL)ETHER	UG/L	90	8	10	10			
SVOC	BIS(2-ETHYLHEXYL)ADIPATE	UG/L	5	5	0.7	2.15			
SVOC	BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	135	45	0.87	680			
SVOC	BUTYL BENZYL PHTHALATE	UG/L	121	13	0.4	11	3000		
SVOC	CARBAZOLE	UG/L	83	5	0.15	0.87			
SVOC	CHRYSENE	UG/L	160	29	0.044	3709	48	48	
SVOC	DIBENZ(A,H)ANTHRACENE	UG/L	152	8	10	10	0.048	0.048	
SVOC	DIBENZOFURAN	UG/L	129	37	0.068	10000			
SVOC	DIETHYL PHTHALATE	UG/L	121	13	1	21	23000		
SVOC	DIMETHYL PHTHALATE	UG/L	117	8	10	10	313000		
SVOC	DI-N-BUTYL PHTHALATE	UG/L	136	23	0.1	1900			
SVOC	DI-N-OCTYL PHTHALATE	UG/L	125	19	0.8	180			
SVOC	FLUORANTHENE	UG/L	168	30	0.043	29260	280	280	
SVOC	FLUORENE	UG/L	161	45	0.042	32000	280	280	
SVOC	FLUOROBENZENE	UG/L	1	1	5	5			
SVOC	HEXACHLOROBENZENE	UG/L	122	8	10	10	0.20		
SVOC	HEXACHLOROBUTADIENE	UG/L	139	8	10	10	4.40		
SVOC	HEXACHLOROCYCLOPENTADIENE	UG/L	119	8	10	10	50		
SVOC	HEXACHLOROETHANE	UG/L	117	8	10	10	19		
SVOC	INDENO(1,2,3-CD)PYRENE	UG/L	171	8	10	10	0.044	0.044	
SVOC	ISOPHORONE	UG/L	117	8	10	10	360		
SVOC	NITROBENZENE	UG/L	121	12	6.7	14	17		
SVOC	N-NITROSODI-N-PROPYLAMINE	UG/L	117	8	10	10	0.050		
SVOC	N-NITROSODIPHENYLAMINE	UG/L	117	12	10	7800	50		
SVOC	N-PROPYLBENZENE	UG/L	40	5	0.62	8			
SVOC	PERYLENE-D12	UG/L	5	5	40	40			
SVOC	PHENANTHRENE	UG/L	185	44	0.11	53000			
SVOC	PHENOL	UG/L	139	11	1	81	300		
SVOC	P-ISOPROPYLTOLUENE	UG/L	18	2	0.14	3.4			
SVOC	PYRENE	UG/L	157	36	0.043	5347	960	960	
VOC	1,1,1-TRICHLOROETHANE	UG/L	82	1	0.9	0.9	200		
VOC	1,1,2,2-TETRACHLOROETHANE	UG/L	82	1	4	4	1.70		
VOC	1,2,4-TRIMETHYLBENZENE	UG/L	40	11	1.7	80			
VOC	1,3,5-TRIMETHYLBENZENE	UG/L	40	8	0.54	15			
VOC	2,4-DINITROPHENOL	UG/L	4	8	10	50	70		
VOC	2-BUTANONE	UG/L	30	1	10	10			
VOC	2-HEXANONE	UG/L	46	2	2	18.9			
VOC	4-ISOPROPYLTOLUENE	UG/L	22	6	1.2	10			
VOC	ACETONE	UG/L	51	15	5.3	300			
VOC	ACROLEIN	UG/L	13	2	29	39	320		
VOC	BENZENE	UG/L	197	55	0.58	1160	5.0	5.0	
VOC	CARBON DISULFIDE	UG/L	48	3	0.7	0.9			
VOC	CHLOROFORM	UG/L	82	1	0.6	0.6	60		
VOC	DICHLOROMETHANE (METHYLENE CHLORIDE)	UG/L	78	11	2	43	5.0		

**TABLE 4-1
STATISTICAL SUMMARY OF HISTORIC GROUNDWATER ANALYTICAL RESULTS**

ANALYTE GROUP	ANALYTE	CONVERTED UNITS	Number of Samples	Number of Detects	Min Detect	Max Detect	WQB-7 HH GROUNDWATER (UG/L) ¹	RBCA GROUNDWATER (UG/L)	EPA SECONDARY MCL (UG/L)
VOC	ETHYLBENZENE	UG/L	194	61	0.54	1750	700	700	
VOC	ISOPROPYLBENZENE	UG/L	40	5	1	6			
VOC	M,P-XYLENES	UG/L	71	20	0.18	79			
VOC	METHYL ETHYL KETONE	UG/L	22	4	4.4	9.6			
VOC	NAPHTHALENE	UG/L	233	63	0.077	7000	100	100	
VOC	N-BUTYLBENZENE	UG/L	40	5	0.54	5.1			
VOC	O-XYLENE	UG/L	72	14	0.25	9	10000		
VOC	SEC-BUTYLBENZENE	UG/L	40	4	0.89	2.3			
VOC	TETRACHLOROETHENE	UG/L	83	1	0.13	0.13			
VOC	TOLUENE	UG/L	193	58	0.14	4500	1000	1000	
VOC	TOTAL XYLENES	UG/L	61	21	1	20100	10000	10000	
VOC	VINYL ACETATE	UG/L	40	1	5	5			
VOC	XYLENE	UG/L	74	44	1	7980			

Notes:

1	Units for dioxins and furans are picograms per liter; WQB-7 criteria based on 2,3,7,8-TCDD toxicity equivalents (DEQ 2004)
HH	Human Health
PCP	Pentachlorophenol
PG/L	Picograms per liter
RBCA	Risk-based corrective action (DEQ 2003)
Region 9	U.S. EPA Region 9 Preliminary Remediation Goals (EPA 2004)
SVOC	Semi-volatile organic compounds
UG/L	Microgram per liter
VOC	Volatile organic compounds
WQB-7	DEQ Water Quality Bureau Circular 7 (DEQ 2004)

**TABLE 4-2
STATISTICAL SUMMARY OF HISTORIC SURFACE SOIL ANALYTICAL RESULTS**

ANALYTE GROUP	ANALYTE	CONVERTED UNITS	Number of Samples	Number of Detects	Min Detect	Max Detect	DAF 10 (MG/KG)	RBCA SURFACE SOIL COMMERCIAL (MG/KG) ¹	RBCA SURFACE SOIL RESIDENTIAL (MG/KG) ¹	REGION 9 RESIDENTIAL SOIL (MG/KG) ^{2,3}	REGION 9 INDUSTRIAL SOIL (MG/KG) ²
DIOXIN/FURAN	1,2,3,4,6,7,8,9-OCDD	NG/KG	17	17	1.2	3241730					
DIOXIN/FURAN	1,2,3,4,6,7,8,9-OCDF	NG/KG	17	12	0.96	1469340					
DIOXIN/FURAN	1,2,3,4,6,7,8-HPCDD	NG/KG	14	14	0.48	799690					
DIOXIN/FURAN	1,2,3,4,6,7,8-HPCDF	NG/KG	11	10	2.4	209150					
DIOXIN/FURAN	1,2,3,4,7,8,9-HPCDF	NG/KG	14	6	5.6	21130					
DIOXIN/FURAN	1,2,3,4,7,8-HXCDD	NG/KG	14	8	0.99	1940					
DIOXIN/FURAN	1,2,3,4,7,8-HXCDF	NG/KG	14	7	0.25	39800					
DIOXIN/FURAN	1,2,3,6,7,8-HXCDD	NG/KG	11	9	1.8	34820					
DIOXIN/FURAN	1,2,3,6,7,8-HXCDF	NG/KG	11	6	3.7	5720					
DIOXIN/FURAN	1,2,3,7,8,9-HXCDD	NG/KG	11	9	1	4920					
DIOXIN/FURAN	1,2,3,7,8,9-HXCDF	NG/KG	11	5	1.9	644					
DIOXIN/FURAN	1,2,3,7,8-PECDD	NG/KG	14	6	5.2	380					
DIOXIN/FURAN	1,2,3,7,8-PECDF	NG/KG	14	7	0.11	4960					
DIOXIN/FURAN	2,3,4,6,7,8-HXCDF	NG/KG	10	5	4.2	670					
DIOXIN/FURAN	2,3,4,7,8-PECDF	NG/KG	11	6	2.3	7440					
DIOXIN/FURAN	2,3,7,8-TCDD	NG/KG	13	6	0.2	11				3.90	15.9
DIOXIN/FURAN	2,3,7,8-TCDF	NG/KG	14	9	0.2	1350					
DIOXIN/FURAN	EPA TEF	NG/KG	14	14	1.10	23377.1				3.90	15.9
DIOXIN/FURAN	OCDD	NG/KG	3	3	4500	180000					
DIOXIN/FURAN	OCDF	NG/KG	3	3	140	2600					
DIOXIN/FURAN	WHO TEF	NG/KG	14	14	1.34	23567.1				3.90	15.9
METAL	ALUMINUM	MG/KG	9	9	7340	13100				76142	100000
METAL	ANTIMONY	MG/KG	10	1	0.7	0.7					
METAL	ARSENIC	MG/KG	10	9	2.1	240.7	10			0.39	1.59
METAL	BARIUM	MG/KG	9	9	79	244					
METAL	BERYLLIUM	MG/KG	12	12	0.2	0.89					
METAL	CADMIUM	MG/KG	12	7	2.2	3.4					
METAL	CALCIUM	MG/KG	9	9	2920	54800					
METAL	CHROMIUM	MG/KG	12	12	7	14					
METAL	COBALT	MG/KG	9	7	3	8				903	1921
METAL	COPPER	MG/KG	12	12	7	98					
METAL	IRON	MG/KG	9	9	10500	16000				23463	100000
METAL	LEAD	MG/KG	39	36	7	29788				400	800
METAL	LEAD DRY WEIGHT	MG/KG	28	28	15	44300					
METAL	MAGNESIUM	MG/KG	9	9	5790	17100					
METAL	MANGANESE	MG/KG	9	9	136	432				1762	19458
METAL	MERCURY	MG/KG	11	5	0.11	0.38					
METAL	NICKEL	MG/KG	12	10	8.8	33					
METAL	POTASSIUM	MG/KG	9	9	429	2530					
METAL	SILVER	MG/KG	12	1	0.2	0.2					
METAL	SODIUM	MG/KG	9	1	1180	1180					
METAL	THALLIUM	MG/KG	11	6	0.4	1.3					
METAL	TIN	MG/KG	9	1	13	13				46924	100000
METAL	VANADIUM	MG/KG	9	6	3	20	3000			78	1022
METAL	ZINC	MG/KG	12	12	44	801	6200			23463	100000
PCP ONLY	PENTACHLOROPHENOL	MG/KG	153	113	0.0028	210000	0.01			2.98	9.00
PETROLEUM HYDROCARBON	C10-C22 ALIPHATICS	MG/KG	8	8	17	5336					
PETROLEUM HYDROCARBON	C10-C22 AROMATICS	MG/KG	4	4	26.8	31600					
PETROLEUM HYDROCARBON	C11-C22 AROMATICS	MG/KG	8	4	51	829		300	70		
PETROLEUM HYDROCARBON	C19-C36 ALIPHATICS	MG/KG	20	19	15	18500		5000	2500		
PETROLEUM HYDROCARBON	C9-C18 ALIPHATICS	MG/KG	20	14	19	12200		600	100		
PETROLEUM HYDROCARBON	DIESEL	MG/KG	9	1	965	965					
PETROLEUM HYDROCARBON	DIESEL RANGE ORGANICS	MG/KG	14	13	20	28873					
PETROLEUM HYDROCARBON	DIESEL RANGE ORGANICS AS DIESEL	MG/KG	4	1	28873	28873					

**TABLE 4-2
STATISTICAL SUMMARY OF HISTORIC SURFACE SOIL ANALYTICAL RESULTS**

ANALYTE GROUP	ANALYTE	CONVERTED UNITS	Number of Samples	Number of Detects	Min Detect	Max Detect	DAF 10 (MG/KG)	RBCA SURFACE SOIL COMMERCIAL (MG/KG) ¹	RBCA SURFACE SOIL RESIDENTIAL (MG/KG) ¹	REGION 9 RESIDENTIAL SOIL (MG/KG) ^{2,3}	REGION 9 INDUSTRIAL SOIL (MG/KG) ²
PETROLEUM HYDROCARBON	EPH SCREEN	MG/KG	4	3	14	230					
PETROLEUM HYDROCARBON	TOTAL EPH	MG/KG	20	20	7	41900					
PETROLEUM HYDROCARBON	TOTAL EXTRACTABLE HYDROCARBONS	MG/KG	29	29	7.8	35200					
PETROLEUM HYDROCARBON	TOTAL EXTRACTABLE HYDROCARBONS - SCREEN	MG/KG	5	3	95	229					
PETROLEUM HYDROCARBON	TOTAL PETROLEUM HYDROCARBONS	MG/KG	178	130	10	33000					
PETROLEUM HYDROCARBON	TOTAL PURGEABLE HYDROCARBONS	MG/KG	7	4	3.7	6					
SVOC	2,3,4,5-TETRACHLOROPHENOL	MG/KG	12	5	3.6	13					
SVOC	2,3,5,6-TETRACHLOROPHENOL	MG/KG	12	6	7.6	45					
SVOC	2,4,5-TRICHLOROPHENOL	MG/KG	21	2	15	18	140			6110	61561
SVOC	2-METHYLNAPHTHALENE	MG/KG	22	1	38000	38000					
SVOC	ACENAPHTHENE	MG/KG	126	5	2.8	12	290	500	500	3682	29219
SVOC	ACENAPHTHYLENE	MG/KG	120	5	1.6	360					
SVOC	ANTHRACENE	MG/KG	125	10	1.3	620	5900	10000	3000	21896	100000
SVOC	BENZO(A)ANTHRACENE	MG/KG	122	14	1.8	116	0.8			0.62	2.11
SVOC	BENZO(A)PYRENE	MG/KG	124	8	1.5	720	4	0.6	0.08	0.062	0.21
SVOC	BENZO(B)FLUORANTHENE	MG/KG	112	3	27.4	108	2	6	0.8	0.62	2.11
SVOC	BENZO(B,K)FLUORANTHENE	MG/KG	12	2	22	36					
SVOC	BENZO(G,H,I)PERYLENE	MG/KG	123	2	93.8	374					
SVOC	BENZO(K)FLUORANTHENE	MG/KG	112	3	29.2	228	20	60	8	6.21	21.1
SVOC	BUTYL BENZYL PHTHALATE	MG/KG	8	1	2200	2200	8100			12221	100000
SVOC	CARBAZOLE	MG/KG	69	2	29	41	0.3			24.3	86.2
SVOC	CHRYSENE	MG/KG	124	10	1	138	80	600	80	62.1	211
SVOC	DIBENZ(A,H)ANTHRACENE	MG/KG	109	3	22.9	76	0.8			0.062	0.21
SVOC	DIBENZ(A,H)ANTHRACENE/INDENO(1,2,3)	MG/KG	6	1	23.4	23.4					
SVOC	DIETHYL PHTHALATE	MG/KG	9	1	210	210				48882	100000
SVOC	DI-N-BUTYL PHTHALATE	MG/KG	8	1	100	100					
SVOC	FLUORANTHENE	MG/KG	124	12	1.1	215	2100	4000	400	2294	22000
SVOC	FLUORENE	MG/KG	124	6	1.1	57	280	600	400	2747	26281
SVOC	INDENO(1,2,3-CD)PYRENE	MG/KG	121	3	70.2	124	7	6	0.8	0.62	2.11
SVOC	PHENANTHRENE	MG/KG	125	10	1.3	151					
SVOC	PYRENE	MG/KG	122	17	1.3	2400	2100	6000	300	2316	29126
VOC	1,1,1-TRICHLOROETHANE	MG/KG	7	4	31	41	1			1200	1200
VOC	1,1,2,2-TETRACHLOROETHANE	MG/KG	7	4	31	41	0.002			0.41	0.93
VOC	1,1,2-TRICHLOROETHANE	MG/KG	7	4	31	41	0.009			0.73	1.61
VOC	1,1-DICHLOROETHANE	MG/KG	7	4	31	41	10			506	1739
VOC	1,1-DICHLOROETHENE	MG/KG	7	4	31	41					
VOC	1,2-DICHLOROETHANE	MG/KG	7	4	31	41	0.01			0.28	0.60
VOC	1,2-DICHLOROETHENE	MG/KG	6	4	31	41					
VOC	1,2-DICHLOROPROPANE	MG/KG	7	4	31	41	0.01			0.34	0.74
VOC	2-BUTANONE	MG/KG	7	4	63	81					
VOC	2-HEXANONE	MG/KG	8	4	63	81					
VOC	4-METHYL-2-PENTANONE	MG/KG	7	4	63	81					
VOC	ACETONE	MG/KG	8	4	63	81	8			14127	54321
VOC	BENZENE	MG/KG	211	123	0.8	41	0.02	0.1	0.1	0.64	1.41
VOC	BROMODICHLOROMETHANE	MG/KG	7	4	31	41	0.3			0.82	1.83
VOC	BROMOFORM	MG/KG	7	4	31	41					
VOC	BROMOMETHANE	MG/KG	7	4	63	81					
VOC	CARBON DISULFIDE	MG/KG	8	5	1	41	20			355	720
VOC	CARBON TETRACHLORIDE	MG/KG	7	4	31	41	0.03			0.25	0.55
VOC	CHLORO BENZENE	MG/KG	7	4	31	41	0.7			151	530
VOC	CHLOROETHANE	MG/KG	7	4	63	81				3.03	6.49
VOC	CHLOROFORM	MG/KG	7	4	31	41	0.3			0.22	0.47
VOC	CHLOROMETHANE (METHYL CHLORIDE)	MG/KG	7	4	63	81				46.9	156
VOC	CIS-1,3-DICHLOROPROPENE	MG/KG	7	4	31	41					

**TABLE 4-2
STATISTICAL SUMMARY OF HISTORIC SURFACE SOIL ANALYTICAL RESULTS**

ANALYTE GROUP	ANALYTE	CONVERTED UNITS	Number of Samples	Number of Detects	Min Detect	Max Detect	DAF 10 (MG/KG)	RBCA SURFACE SOIL COMMERCIAL (MG/KG) ¹	RBCA SURFACE SOIL RESIDENTIAL (MG/KG) ¹	REGION 9 RESIDENTIAL SOIL (MG/KG) ^{2,3}	REGION 9 INDUSTRIAL SOIL (MG/KG) ²
VOC	DIBROMOCHLOROMETHANE	MG/KG	7	4	31	41	0.2			1.11	2.55
VOC	DICHLOROMETHANE (METHYLENE CHLORIDE)	MG/KG	7	5	6	140					
VOC	ETHYLBENZENE	MG/KG	210	11	2.7	41	7	40	40	395	395
VOC	M,P-XYLENES	MG/KG	21	1	0.098	0.098					
VOC	NAPHTHALENE	MG/KG	144	2	4.3	16000	40	30	30	55.9	188
VOC	STYRENE	MG/KG	7	4	31	41	2			1700	1700
VOC	TETRACHLOROETHENE	MG/KG	7	4	31	41					
VOC	TOLUENE	MG/KG	211	60	2.3	41	6	40	40	520	520
VOC	TOTAL XYLENES	MG/KG	204	14	0.098	94.5	100			271	420
VOC	TRANS-1,3-DICHLOROPROPENE	MG/KG	7	4	31	41					
VOC	TRICHLOROETHENE	MG/KG	7	4	31	41	0.03			0.053	0.11
VOC	VINYL ACETATE	MG/KG	6	4	63	81	80			426	1396
VOC	VINYL CHLORIDE	MG/KG	7	4	63	81	0.007			0.079	0.75
VOC	XYLENE	MG/KG	6	4	31	41					

Notes:

The following samples are associated with removed soil and are not included in the data statistics:

KPT Facility: G50(1991), PT-116(1996), SS-00-C-DUP(1998), SS-1(1998), SS-10(1998), SS-10C(1998), SS-1CA(1998), SS-1D(1998), SS-1F(1998), SS-9(1998), SS-9B(1998), SS-9C(1998), and TA-3(1991)

Yale Oil Facility: ST-1, ST-1B, ST-2, ST-3, ST-3B, YR-SL-1, and YR-SO-5

- 1 Surface soil criteria based on soil depth less than 2 feet and depth to groundwater of 10-20 feet.
- 2 Units for dioxins and furans are nanograms per kilogram; Region 9 criteria based on 2,3,7,8-TCDD toxicity equivalents (EPA 2004)
- 3 Residential action level for arsenic = 40 mg/kg (DEQ 2005a)
- DAF Dillution/attenuation factor (EPA 2004)
- MG/KG Milligrams per kilogram
- NG/KG Nanograms per kilogram
- PCP Pentachlorophenol
- RBCA Risk-based corrective action (DEQ 2003)
- Region 9 U.S. EPA Region 9 Preliminary Remediation Goals
- SVOC Semi-volatile organic compounds
- VOC Volatile organic compounds

**TABLE 4-3
STATISTICAL SUMMARY OF HISTORIC SUBSURFACE SOIL ANALYTICAL RESULTS**

ANALYTE GROUP	ANALYTE	CONVERTED UNITS	Number of Samples	Number of Detects	Min Detect	Max Detect	DAF 10 (MG/KG)	RBCA SUBSURFACE SOIL (MG/KG) ¹	REGION 9 RESIDENTIAL SOIL (MG/KG) ²	REGION 9 INDUSTRIAL SOIL (MG/KG) ²
DIOXIN/FURAN	1,2,3,4,6,7,8,9-OCDD	NG/KG	5	5	200000	3840000				
DIOXIN/FURAN	1,2,3,4,6,7,8,9-OCDF	NG/KG	5	5	24000	62200				
DIOXIN/FURAN	1,2,3,4,6,7,8-HPCDD	NG/KG	7	7	46200	1110000				
DIOXIN/FURAN	1,2,3,4,6,7,8-HPCDF	NG/KG	6	6	4800	84000				
DIOXIN/FURAN	1,2,3,4,7,8,9-HPCDF	NG/KG	6	6	450	6400				
DIOXIN/FURAN	1,2,3,4,7,8-HXCDD	NG/KG	5	5	37	1300				
DIOXIN/FURAN	1,2,3,4,7,8-HXCDF	NG/KG	6	5	1500	7200				
DIOXIN/FURAN	1,2,3,6,7,8-HXCDD	NG/KG	7	7	1800	45300				
DIOXIN/FURAN	1,2,3,6,7,8-HXCDF	NG/KG	6	6	150	1100				
DIOXIN/FURAN	1,2,3,7,8,9-HXCDD	NG/KG	6	6	140	33100				
DIOXIN/FURAN	1,2,3,7,8,9-HXCDF	NG/KG	5	5	60	240				
DIOXIN/FURAN	1,2,3,7,8-PECDD	NG/KG	6	6	19	340				
DIOXIN/FURAN	1,2,3,7,8-PECDF	NG/KG	6	6	55	3400				
DIOXIN/FURAN	2,3,4,6,7,8-HXCDF	NG/KG	4	4	260	1000				
DIOXIN/FURAN	2,3,4,7,8-PECDF	NG/KG	7	7	190	4500				
DIOXIN/FURAN	2,3,7,8-TCDD	NG/KG	4	2	3	19			3.90	15.9
DIOXIN/FURAN	2,3,7,8-TCDF	NG/KG	7	7	30	1500				
DIOXIN/FURAN	EPA TEF	NG/KG	7	7	1090.9	21565			3.90	15.9
DIOXIN/FURAN	OCDD	NG/KG	2	2	770000	990000				
DIOXIN/FURAN	OCDF	NG/KG	2	2	280000	460000				
DIOXIN/FURAN	WHO TEF	NG/KG	7	7	1090.9	21620			3.90	15.9
METAL	ALUMINUM	MG/KG	10	10	4300	14000			76142	100000
METAL	ARSENIC	MG/KG	9	5	3.3	8.4	10		0.39	1.59
METAL	BARIUM	MG/KG	10	10	29	220				
METAL	BERYLLIUM	MG/KG	10	10	0.2	0.8				
METAL	CADMIUM	MG/KG	15	2	2	3				
METAL	CALCIUM	MG/KG	10	10	1583	52000				
METAL	CHROMIUM	MG/KG	9	9	5	7				
METAL	COBALT	MG/KG	10	9	3	7			903	1921
METAL	COPPER	MG/KG	10	10	7	18				
METAL	IRON	MG/KG	10	10	5000	15000			23463	100000
METAL	LEAD	MG/KG	39	33	5	4190			400	800
METAL	MAGNESIUM	MG/KG	9	9	4488	13500				
METAL	MANGANESE	MG/KG	10	10	154	668			1762	19458
METAL	NICKEL	MG/KG	10	8	5	12				
METAL	POTASSIUM	MG/KG	10	8	284	1520				
METAL	SELENIUM	MG/KG	9	7	0.7	2.8	3		391	5110
METAL	SILVER	MG/KG	10	7	0.01	1.5				
METAL	SODIUM	MG/KG	10	9	41	1010				
METAL	THALLIUM	MG/KG	7	6	0.05	0.1				
METAL	TIN	MG/KG	10	6	0.6	0.9			46924	100000
METAL	TOTAL CHROMIUM	MG/KG	6	6	4	11				
METAL	VANADIUM	MG/KG	10	10	4	9	3000		78.2	1022
METAL	ZINC	MG/KG	15	15	22	51	6200		23463	100000
PCP ONLY	PENTACHLOROPHENOL	MG/KG	104	43	0.0046	2200	0.01		2.98	9.00
PESTICIDE	ENDRIN	MG/KG	9	1	0.00095	0.00095	0.5		18.3	185
PETROLEUM HYDROCARBON	C10-C22 ALIPHATICS	MG/KG	41	41	3	23386				
PETROLEUM HYDROCARBON	C10-C22 AROMATICS	MG/KG	28	26	8.22	20000				
PETROLEUM HYDROCARBON	C11-C22 AROMATICS	MG/KG	21	20	38	2150		400		
PETROLEUM HYDROCARBON	C19-C36 ALIPHATICS	MG/KG	90	87	4	30316		5000		
PETROLEUM HYDROCARBON	C5-C8 ALIPHATICS	MG/KG	61	26	1.6	1110		100		
PETROLEUM HYDROCARBON	C9-C10 AROMATICS	MG/KG	59	30	2.5	1040		30		

**TABLE 4-3
STATISTICAL SUMMARY OF HISTORIC SUBSURFACE SOIL ANALYTICAL RESULTS**

ANALYTE GROUP	ANALYTE	CONVERTED UNITS	Number of Samples	Number of Detects	Min Detect	Max Detect	DAF 10 (MG/KG)	RBCA SUBSURFACE SOIL (MG/KG) ¹	REGION 9 RESIDENTIAL SOIL (MG/KG) ²	REGION 9 INDUSTRIAL SOIL (MG/KG) ²
PETROLEUM HYDROCARBON	C9-C12 ALIPHATICS	MG/KG	60	31	2.3	3960		500		
PETROLEUM HYDROCARBON	C9-C18 ALIPHATICS	MG/KG	90	86	3	40300		1000		
PETROLEUM HYDROCARBON	DIESEL	MG/KG	50	12	85	40900				
PETROLEUM HYDROCARBON	DIESEL RANGE ORGANICS	MG/KG	86	70	47	58600				
PETROLEUM HYDROCARBON	DIESEL RANGE ORGANICS AS DIESEL	MG/KG	34	16	18	29700				
PETROLEUM HYDROCARBON	EPH SCREEN	MG/KG	4	3	11	39				
PETROLEUM HYDROCARBON	GASOLINE RANGE ORGANICS	MG/KG	13	11	16	4900				
PETROLEUM HYDROCARBON	GASOLINE RANGE ORGANICS AS GASOLINE	MG/KG	1	1	244	244				
PETROLEUM HYDROCARBON	LUBE OIL AND RELATED PRODUCTS	MG/KG	1	1	200	200				
PETROLEUM HYDROCARBON	TOTAL EPH	MG/KG	63	63	7	58179				
PETROLEUM HYDROCARBON	TOTAL EXTRACTABLE HYDROCARBONS	MG/KG	125	112	7.5	80200				
PETROLEUM HYDROCARBON	TOTAL EXTRACTABLE HYDROCARBONS - SCREEN	MG/KG	10	4	313	8110				
PETROLEUM HYDROCARBON	TOTAL PETROLEUM HYDROCARBON	MG/KG	3	2	925	1575				
PETROLEUM HYDROCARBON	TOTAL PETROLEUM HYDROCARBONS	MG/KG	39	39	18	43000				
PETROLEUM HYDROCARBON	TOTAL PURGEABLE HYDROCARBONS	MG/KG	38	31	6	6110				
SVOC	1-METHYLNAPHTHALENE	MG/KG	12	3	0.65	191				
SVOC	2,3,4,5-TETRACHLOROPHENOL	MG/KG	8	1	0.0076	0.0076				
SVOC	2,3,5,6-TETRACHLOROPHENOL	MG/KG	8	1	0.023	0.023				
SVOC	2,4,5-TRICHLOROPHENOL	MG/KG	29	1	0.0068	0.0068	140		6110	61561
SVOC	2,4,6-TRICHLOROPHENOL	MG/KG	29	1	0.0096	0.0096	0.08		6.11	61.6
SVOC	2,6-DIMETHYLNAPHTHALENE	MG/KG	6	2	5	319				
SVOC	2-METHYLNAPHTHALENE	MG/KG	83	31	0.11	1000				
SVOC	2-NITROANILINE	MG/KG	18	2	5.4	35			183	1830
SVOC	ACENAPHTHENE	MG/KG	164	42	0.3	1400	290	500	3682	29219
SVOC	ACENAPHTHYLENE	MG/KG	160	33	0.25	390				
SVOC	ANTHRACENE	MG/KG	167	33	0.2	480	5900	10000	21896	100000
SVOC	BENZO(A)ANTHRACENE	MG/KG	148	34	0.0441	140	0.8		0.62	2.11
SVOC	BENZO(A)PYRENE	MG/KG	165	13	0.0168	8	4	10	0.062	0.21
SVOC	BENZO(B)FLUORANTHENE	MG/KG	107	9	0.0225	2.1	2	200	0.62	2.11
SVOC	BENZO(B,K)FLUORANTHENE	MG/KG	58	1	5.4	5.4				
SVOC	BENZO(G,H,I)PERYLENE	MG/KG	165	7	0.0778	0.9				
SVOC	BENZO(K)FLUORANTHENE	MG/KG	107	10	0.0205	10	20	2000	6.21	21.1
SVOC	BIPHENYL	MG/KG	6	1	14	14				
SVOC	BIS(2-ETHYLHEXYL)PHTHALATE	MG/KG	34	4	0.06	0.95				
SVOC	CARBAZOLE	MG/KG	66	16	1.7	550	0.3		24.3	86.2
SVOC	CHRYSENE	MG/KG	165	16	0.148	31	80	5000	62.1	211
SVOC	DIBENZ(A,H)ANTHRACENE	MG/KG	117	7	0.0628	1.4	0.8		0.062	0.21
SVOC	DIBENZOFURAN	MG/KG	27	8	0.53	39			145	1563
SVOC	DIETHYL PHTHALATE	MG/KG	36	1	1.2	1.2			48882	100000
SVOC	DIMETHYL PHTHALATE	MG/KG	34	1	0.6	0.6			100000	100000
SVOC	DI-N-BUTYL PHTHALATE	MG/KG	34	4	0.05	0.13				
SVOC	DI-N-OCTYL PHTHALATE	MG/KG	36	1	0.24	0.24	100000		2444	24624
SVOC	FLOURENE	MG/KG	2	1	0.86	0.86				
SVOC	FLUORANTHENE	MG/KG	165	53	0.36	200	2100	4000	2294	22000
SVOC	FLUORENE	MG/KG	165	44	0.06	1900	280	600	2747	26281
SVOC	INDENO(1,2,3-CD)PYRENE	MG/KG	161	8	0.0382	1.45	7	40	0.62	2.11
SVOC	N-NITROSODIPHENYLAMINE	MG/KG	36	5	71	1400	0.6		99.3	352
SVOC	PHENANTHRENE	MG/KG	167	46	0.08	1200				
SVOC	PYRENE	MG/KG	165	53	0.16	660	2100	7000	2316	29126
VOC	1,1,1-TRICHLOROETHANE	MG/KG	10	1	0.047	0.047	1		1200	1200
VOC	2-BUTANONE	MG/KG	10	1	10.33	10.33				

**TABLE 4-3
STATISTICAL SUMMARY OF HISTORIC SUBSURFACE SOIL ANALYTICAL RESULTS**

ANALYTE GROUP	ANALYTE	CONVERTED UNITS	Number of Samples	Number of Detects	Min Detect	Max Detect	DAF 10 (MG/KG)	RBCA SUBSURFACE SOIL (MG/KG) ¹	REGION 9 RESIDENTIAL SOIL (MG/KG) ²	REGION 9 INDUSTRIAL SOIL (MG/KG) ²
VOC	2-HEXANONE	MG/KG	11	1	0.97	0.97				
VOC	BENZENE	MG/KG	121	13	0.00012	12	0.02	0.1	0.64	1.41
VOC	CARBON DISULFIDE	MG/KG	11	1	0.072	0.072	20		355	720
VOC	DICHLOROMETHANE (METHYLENE CHLORIDE)	MG/KG	1	1	0.005	0.005				
VOC	ETHYLBENZENE	MG/KG	118	30	0.00036	83	7	40	395	395
VOC	M,P-XYLENES	MG/KG	59	16	0.16	35				
VOC	METHYL TERT-BUTYL ETHER	MG/KG	57	2	0.5	0.5				
VOC	METHYLENE CHLORIDE	MG/KG	12	3	0.007	0.23	0.01		9.11	20.5
VOC	M-XYLENE	MG/KG	6	1	0.09	0.09				
VOC	NAPHTHALENE	MG/KG	221	49	0.25	260	40	30	55.9	188
VOC	O,P-XYLENES	MG/KG	6	1	0.042	0.042				
VOC	O-XYLENE	MG/KG	59	13	0.07	6.1				
VOC	TOLUENE	MG/KG	121	18	0.00054	270	6	40	520	520
VOC	TOTAL XYLENES	MG/KG	97	36	0.00074	600	100		271	420
VOC	XYLENE	MG/KG	13	9	0.017	56				

Notes:

The following samples are associated with removed soil and are not included in the data statistics:

KPT Facility: G50(1991), PT-116(1996), SS-00-C-DUP(1998), SS-1(1998), SS-10(1998), SS-10C(1998), SS-1CA(1998), SS-1D(1998), SS-1F(1998), SS-9(1998), SS-9B(1998), SS-9C(1998), and TA-3(1991)

Yale Oil Facility: ST-1, ST-1B, ST-2, ST-3, ST-3B, YR-SL-1, and YR-SO-5

1 Subsurface soil criteria based soil depth greater than 2 feet and depth to groundwater of 10-20 feet.

2 Units for dioxins and furans are nanograms per kilogram; Region 9 criteria based on 2,3,7,8-TCDD toxicity equivalents (EPA 2004)

DAF Dillution/attenuation factor (EPA 2004)

MG/KG Milligrams per kilogram

NG/KG Nanograms per kilogram

PCP Pentachlorophenol

RBCA Risk-based corrective action (DEQ 2003)

Region 9 U.S. EPA Region 9 Preliminary Remediation Goals

SVOC Semi-volatile organic compounds

VOC Volatile organic compounds

TABLE 4-4
STATISTICAL SUMMARY OF HISTORIC SLUDGE, WASTE, AND PRODUCT ANALYTICAL RESULTS

MEDIA	ANALYTE GROUP	CONVERTED UNITS	ANALYTE	Number of Samples	Number of Detects	Min Detect	Max Detect	DAF 10 (MG/KG)	RBCA SUBSURFACE SOIL (MG/KG) ¹	RBCA SURFACE SOIL COMMERCIAL (MG/KG) ²	RBCA SURFACE SOIL RESIDENTIAL (MG/KG) ²	REGION 9 RESIDENTIAL SOIL (MG/KG) ³	REGION 9 INDUSTRIAL SOIL (MG/KG) ³
PRODUCT	DIOXIN/FURAN	PG/L	1,2,3,4,6,7,8,9-OCDD	1	1	1300000000	1300000000						
PRODUCT	DIOXIN/FURAN	PG/L	1,2,3,4,6,7,8,9-OCDF	1	1	110000000	110000000						
PRODUCT	PCP ONLY	UG/L	PENTACHLOROPHENOL	1	1	1300000	1300000	0.01				2.98	9.00
PRODUCT	SVOC	MG/KG	ACENAPHTHENE	1	1	63	63	290	500	500	500	3682	29219
PRODUCT	SVOC	MG/KG	ACENAPHTHYLENE	1	1	74	74						
PRODUCT	SVOC	MG/KG	ACENAPHTHYLENE	1	1	21	21						
PRODUCT	SVOC	MG/KG	ANTHRACENE	1	3	43	92	5900	10000	10000	3000	21896	100000
PRODUCT	SVOC	MG/KG	BENZO(A)ANTHRACENE	1	1	36	36	0.8				0.62	2.11
PRODUCT	SVOC	MG/KG	BENZO(A)ANTHRACENE	1	2	140	1400	0.8				0.62	2.11
PRODUCT	SVOC	MG/KG	BENZO(A)PYRENE	1	2	50	2900	4	10	0.6	0.08	0.062	0.21
PRODUCT	SVOC	MG/KG	BENZO(B,K)FLUORANTHENE	1	1	35	35						
PRODUCT	SVOC	MG/KG	BENZO(G,H,I)PERYLENE	1	1	1100	1100						
PRODUCT	SVOC	MG/KG	CHRYSENE	1	1	34	34	80	5000	600	80	62.1	211
PRODUCT	SVOC	MG/KG	CHRYSENE	1	3	160	3400	80	5000	600	80	62.1	211
PRODUCT	SVOC	MG/KG	FLUORANTHENE	1	1	57	57	2100	4000	4000	400	2294	22000
PRODUCT	SVOC	MG/KG	FLUORENE	1	1	220	220	280	600	600	400	2747	26281
PRODUCT	SVOC	MG/KG	FLUORENE	1	1	290	290	280	600	600	400	2747	26281
PRODUCT	SVOC	MG/KG	N-NITROSODIPHENYLAMINE	1	2	890	1000	0.6				99.3	352
PRODUCT	SVOC	MG/KG	N-NITROSODIPHENYLAMINE	1	1	1100	1100	0.6				99.3	352
PRODUCT	SVOC	MG/KG	PHENANTHRENE	1	1	220	220						
PRODUCT	SVOC	MG/KG	PHENANTHRENE	1	5	40	1200						
PRODUCT	SVOC	MG/KG	PYRENE	1	3	330	6000	2100	7000	6000	300	2316	29126
PRODUCT	SVOC	UG/L	ACENAPHTHYLENE	1	ND	ND	ND						
PRODUCT	SVOC	UG/L	BENZO(A)ANTHRACENE	1	ND	ND	ND	0.8				0.62	2.11
PRODUCT	SVOC	UG/L	BENZO(A)PYRENE	1	ND	ND	ND	4	10	0.6	0.08	0.062	0.21
PRODUCT	SVOC	UG/L	FLUORANTHENE	1	ND	ND	ND	2100	4000	4000	400	2294	22000
PRODUCT	SVOC	UG/L	PHENANTHRENE	1	1	3300000	3300000						
PRODUCT	VOC	MG/KG	NAPHTHALENE	1	1	660	660	40	30	30	30	55.9	188
PRODUCT	VOC	MG/KG	NAPHTHALENE	1	1	78	78	40	30	30	30	55.9	188
PRODUCT	VOC	UG/L	NAPHTHALENE	1	ND	ND	ND	40	30	30	30	55.9	188
SLUDGE	DIOXIN/FURAN	NG/KG	1,2,3,4,6,7,8,9-OCDD	1	1	11000	11000					3.90	15.9
SLUDGE	DIOXIN/FURAN	NG/KG	1,2,3,4,6,7,8,9-OCDF	1	ND	ND	ND						
SLUDGE	METAL	MG/KG	ALUMINIUM	4	3	14	1890					76142	100000
SLUDGE	METAL	MG/KG	BARIUM	2	1	0.5	0.5						
SLUDGE	METAL	MG/KG	BERYLLIUM	4	2	0.36	0.94						
SLUDGE	METAL	MG/KG	CALCIUM	4	3	40	5740						
SLUDGE	METAL	MG/KG	CHROMIUM	3	2	14	33						
SLUDGE	METAL	MG/KG	COBALT	4	2	2.6	2.8					903	1921
SLUDGE	METAL	MG/KG	COPPER	4	2	9.4	65						
SLUDGE	METAL	MG/KG	IRON	4	4	16	13200					23463	100000
SLUDGE	METAL	MG/KG	LEAD	3	3	9	33					400	800
SLUDGE	METAL	MG/KG	MAGNESIUM	4	3	12	1040						
SLUDGE	METAL	MG/KG	MANGANESE	4	4	1.1	155					1762	19458
SLUDGE	METAL	MG/KG	NICKEL	2	1	1.6	1.6						
SLUDGE	METAL	MG/KG	POTASSIUM	4	4	4	1040						
SLUDGE	METAL	MG/KG	SILVER	4	1	0.2	0.2						
SLUDGE	METAL	MG/KG	SODIUM	4	3	9.4	416						
SLUDGE	METAL	MG/KG	VANADIUM	2	1	3.1	3.1	3000				78.2	1022
SLUDGE	METAL	MG/KG	ZINC	4	3	2.2	39	6200				23463	100000
SLUDGE	PCP ONLY	MG/KG	PENTACHLOROPHENOL	4	2	0.038	1.2	0.01				2.98	9.00
SLUDGE	PESTICIDE	MG/KG	AROCLOR 1254	1	1	3,522	3,522						
SLUDGE	SVOC	MG/KG	2-METHYLNAPHTHALENE	4	2	120	130						
SLUDGE	SVOC	MG/KG	ACENAPHTHENE	3	1	63	63	290	500	500	500	3682	29219
SLUDGE	SVOC	MG/KG	ACENAPHTHYLENE	3	1	74	74						

**TABLE 4-4
STATISTICAL SUMMARY OF HISTORIC SLUDGE, WASTE, AND PRODUCT ANALYTICAL RESULTS**

MEDIA	ANALYTE GROUP	CONVERTED UNITS	ANALYTE	Number of Samples	Number of Detects	Min Detect	Max Detect	DAF 10 (MG/KG)	RBCA SUBSURFACE SOIL (MG/KG) ¹	RBCA SURFACE SOIL COMMERCIAL (MG/KG) ²	RBCA SURFACE SOIL RESIDENTIAL (MG/KG) ²	REGION 9 RESIDENTIAL SOIL (MG/KG) ³	REGION 9 INDUSTRIAL SOIL (MG/KG) ³
SLUDGE	SVOC	MG/KG	ACENAPHTHYLENE	3	1	21	21						
SLUDGE	SVOC	MG/KG	ANTHRACENE	5	3	43	92	5900	10000	10000	3000	21896	100000
SLUDGE	SVOC	MG/KG	BENZO(A)ANTHRACENE	3	1	36	36	0.8				0.62	2.11
SLUDGE	SVOC	MG/KG	BENZO(A)ANTHRACENE	3	2	140	1400	0.8				0.62	2.11
SLUDGE	SVOC	MG/KG	BENZO(A)PYRENE	3	2	50	2900	4	10	0.6	0.08	0.062	0.21
SLUDGE	SVOC	MG/KG	BENZO(B,K)FLUORANTHENE	1	1	35	35						
SLUDGE	SVOC	MG/KG	BENZO(G,H,I)PERYLENE	3	1	1100	1100						
SLUDGE	SVOC	MG/KG	CHRYSENE	3	1	34	34	80	5000	600	80	62.1	211
SLUDGE	SVOC	MG/KG	CHRYSENE	3	3	160	3400	80	5000	600	80	62.1	211
SLUDGE	SVOC	MG/KG	FLOURENE	2	1	42	42						
SLUDGE	SVOC	MG/KG	FLUORANTHENE	3	1	57	57	2100	4000	4000	400	2294	22000
SLUDGE	SVOC	MG/KG	FLUORENE	3	1	220	220	280	600	600	400	2747	26281
SLUDGE	SVOC	MG/KG	FLUORENE	3	1	290	290	280	600	600	400	2747	26281
SLUDGE	SVOC	MG/KG	N-NITROSODIPHENYLAMINE	5	2	890	1000	0.6				99.3	352
SLUDGE	SVOC	MG/KG	N-NITROSODIPHENYLAMINE	5	1	1100	1100	0.6				99.3	352
SLUDGE	SVOC	MG/KG	PHENANTHRENE	5	1	220	220						
SLUDGE	SVOC	MG/KG	PHENANTHRENE	5	5	40	1200						
SLUDGE	SVOC	MG/KG	PYRENE	3	3	330	6000	2100	7000	6000	300	2316	29126
SLUDGE	VOC	MG/KG	NAPHTHALENE	3	1	660	660	40	30	30	30	55.9	188
SLUDGE	VOC	MG/KG	NAPHTHALENE	3	1	78	78	40	30	30	30	55.9	188
WASTE	PETROLEUM HYDROCARBON	MG/KG	DIESEL RANGE ORGANICS	2	2	535000	614000						
WASTE	PETROLEUM HYDROCARBON	MG/KG	TOTAL EXTRACTABLE HYDRO	2	2	703000	773000						

Notes:
The following samples are associated with removed soil and are not included in the data statistics:
KPT Facility: G50(1991), PT-116(1996), SS-00-C-DUP(1998), SS-1(1998), SS-10(1998), SS-10C(1998), SS-1CA(1998), SS-1D(1998), SS-1F(1998), SS-9(1998), SS-9B(1998), SS-9C(1998), and TA-3(1991)
Yale Oil Facility: ST-1, ST-1B, ST-2, ST-3, ST-3B, YR-SL-1, and YR-SO-5

- 1 Subsurface soil criteria based on soil depth greater than 2 feet and depth to groundwater 10-20 feet.
- 2 Surface soil criteria based on soil depth less than 2 feet and depth to groundwater 10-20 feet.
- 3 Units for dioxins and furans are nanograms per kilogram; Region 9 criteria based on 2,3,7,8-TCDD toxicity equivalents (EPA 2004)

DAF Dillution/attenuation factor (EPA 2004)
MG/KG Milligrams per kilogram
ND Not Detected
PCP Pentachlorophenol
RBCA Risk-based corrective action (DEQ 2003)
Region 9 U.S. EPA Region 9 Preliminary Remediation Goals
SVOC Semi-volatile organic compounds
VOC Volatile organic compounds

TABLE 4-5
SUMMARY OF INVESTIGATIONS, INTERIM ACTIONS AND DATA QUALITY
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Year	Facility	Investigation Title	Year Published	Contractor/Agency	Summary of Investigation Activities	Category	Summary of Data Quality
1985	KPT	<i>Preliminary Assessment</i>	July 17, 1985	DEQ (formerly MDHES)	A preliminary site assessment was written for the KPT facility based on an on-site visit to the property by Montanan Department of Environmental Quality (MDEQ) personnel on August 10, 1983. The assessment noted the potential for PCP contamination at the facility.	X	-
1985	Reliance	<i>Field Investigation Report, Reliance Refinery, Kalispell, Montana</i>	October 30, 1985	DEQ (formerly MDHES)	DEQ conducted an initial field investigation; 8 test pits were dug along the eastern edge of the property and 2 samples were obtained and analyzed for total metals.	Q	-
1985	Yale	<i>Subsurface Investigation and Remedial Action Plan, Exxon Bulk Plant, Kalispell, Montana</i>	October 14, 1985	Applied Earth Sciences, Inc. (AES)	12 monitoring wells installed (two wells already existed on property, W-5 and W-6): MW-1 through MW-4 and MW-7 through MW-14. A total of 29 samples collected during the investigation: 10 samples (5 groundwater, 4 soil, and 1 sludge) were sent to Rocky Mountain Analytical Laboratories and 19 samples (1 background soil, 2 source material, 1 free product, 5 groundwater, and 10 subsurface soil) were sent to EA Engineering for analysis.	P	Partial review was conducted on data from EA Engineering. QC data include quantitation reports and chromatograms for each sample, GC/MS instrument tuning and calibration results, for SVOC analysis, and blank results. QC data were acceptable, and results can be used as reported. No QC data were available for results obtained from Rocky Mountain Analytical Laboratories. As such, these data should be used with caution.
1986	Yale	<i>Oil Spill Investigation and Remedial Action Plan, Exxon Bulk Plant, Kalispell, Montana</i>	May 14, 1986	Applied Earth Sciences, Inc. (AES)	Three product samples retrieved; 2 from inside the tank bottom and 1 from next to tank bottom where product was visible. Three monitoring wells (MW-15, MW-16, & MW-17) were installed, but not developed. Soil samples were taken from the boreholes every 5 feet unless soil type changed. Twelve soil samples were collected, but only 6 were analyzed (2 from each borehole).	P	QC results, including matrix spike, duplicates, and calibration verification checks were acceptable and required no qualification of data.
1986	Yale	<i>Report of Sampling Activities, Yale Refinery, Kalispell, Montana and Draft Analytical Results Report, Yale Refinery, Kalispell, Montana</i>	May 6, 1986 and July 31, 1986	U.S. Environmental Protection Agency (EPA) Field Investigation Team (FIT)	Groundwater samples were collected from 5 monitoring wells previously installed by AES in 1985. Two soil samples were collected from the Yale site and a third was taken from the Montana Power Company tract (6B). One sludge sample was obtained from the southern edge of the abandoned tank bottom. (Analytical Results report discusses laboratory results of samples acquired during the field investigation in February and March 1986).	F	Full data validation was conducted by EPA contractors, and QC summaries were included with results. Due to blank contamination, results for methylene chloride, di-n-butylphthalate, and 2-hexanone were qualified with a “B” and should be considered laboratory contamination. Results for arsenic, 2-butanone, 2-chloroethylvinyl ether, 3-nitroaniline, and vinyl acetate were rejected (qualified “R”). All positive results reported less than the required reporting limit were qualified as estimated (J). Surrogate recoveries for the sludge sample were acceptable; no other associated QC data were reported. As such, an assessment of data quality for the sludge sample is not possible.
1986	Yale	<i>Sampling Activities Report, Yale Refinery, Kalispell, Montana</i>	August 5, 1986	EPA FIT	Additional sampling was conducted at theYale Refinery site to test for dioxin contamination. All samples taken by FIT were split with AES. Three shallow soil samples were collected as well as 1 sludge sample from within the abandoned tank bottom.	Q	-
1986	Yale	<i>Addendum to Oil Spill Investigation and Remedial Action Plan, Exxon Bulk Plant, Kalispell, Montana</i>	September 17, 1986	AES	This document discusses the sampling event that took place on June 30, 1986 (above) by the EPA FIT. One background soil sample (RR-SO-8) is mentioned as being collected 3,000 feet due west of the Exxon site. This sample served as the background sample for both the Yale and Reliance Refinery sites. In addition, this document addresses the comments made by Montana Dept. of Environmental Quality (MDEQ) to the remedial action plan submitted on May 14, 1986.	P	Only Dioxin data were reviewed. QC results, including matrix spike, duplicates, and calibration verification checks were acceptable and required no qualification of data.
1986	Reliance	<i>Sampling Activities Report for Reliance Refinery, Kalispell, Montana</i>	April 15, 1986	EPA FIT	Investigation of site; 3 monitoring wells installed (RR-MW-1 through RR-MW-3), seven groundwater samples collected including one residential well and a municipal supply well, 4 soil samples (including one background soil sample), and 2 sludge samples. An electromagnetic survey was also conducted to determine buried metal. One tank bottom was discovered through this process.	F	Some arsenic and thallium soil and groundwater data were qualified as rejected (R) due to very low MS recoveries. Soil data for antimony, lead, and mercury were qualified as rejected (R) due to issues with matrix interference. Barium, calcium, and sodium data were qualified as estimated (C and E) because of a potential interference. Aluminum and zinc groundwater results were qualified as estimated (J) due to blank contamination. Methylene chloride, acetone, 2-butanone, and phthalates were detected in laboratory method blanks and caused some data to be qualified as estimated (JB) due to blank contamination. Results for 2-hexanone were also estimated due to poor duplicate precision. Other data were qualified as estimated due to holding time (J), and because chain-of-custody records were incomplete (Q). Rejected data are not usable. Estimated data should be used with the understanding that the result may not be accurate.
		<i>Draft Analytical Results for Reliance Refinery, Kalispell, Montana</i>	July 22, 1986		Document outlines results of laboratory analyses on samples acquired during the field investigation of the Reliance Refinery in February & June 1986.		
1986	Reliance	<i>Sampling Activities Report, Reliance Refinery, Kalispell, Montana</i>	August 4, 1986	EPA FIT	Collection of four surface soil samples and five sludge samples to determine dioxin contamination at the Reliance site. Samples were collected concurrently with those at the Yale Refinery on June 30, 1986.		
		<i>Draft Analytical Results, Reliance Refinery, Kalispell, Montana</i>	October 21, 1986		Document outlines results of laboratory analyses on samples acquired during the field investigation of the Reliance Refinery in June 1986.		

TABLE 4-5
SUMMARY OF INVESTIGATIONS, INTERIM ACTIONS AND DATA QUALITY
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Year	Facility	Investigation Title	Year Published	Contractor/Agency	Summary of Investigation Activities	Category	Summary of Data Quality
1989	Reliance / KPT	<i>Final Report for Kalispell Post and Pole/Reliance Refinery, Kalispell, Montana</i>	June 30, 1989	MSE, Inc (MSE)	Three monitoring wells were installed on the Kalispell Pole and Timber Co. (KPT) property. Five groundwater samples were taken from KPT, two were collected from Reliance Refinery wells RR-MW-1 & RR-MW-2, and one groundwater sample was taken from Yale Refinery monitoring well MW-12. Six soil samples were obtained (3 from KPT and 3 from Reliance), and 1 sludge sample was collected from a buried drum on the Reliance site.	P	MSE summarized the laboratory QC findings in the report. The report indicates that field blanks contained trace concentrations of metals, methylene chloride, and one dioxin isomer. The report indicates that these are as expected and do not cause data to be questioned. The laboratory QC samples were also reviewed by MSE. The report indicates that no problems were encountered during analysis of VOCs in waters; however, issues related to surrogate recoveries and internal standard responses for VOCs in soil were identified. As such, VOC results for SS-1, SS-2, SS-5, and SS-6 should be considered estimated. Matrix affects were apparent in the SVOC analysis of samples GW-2, GW-4, and GW-7. As such, SVOC results for these wells should be considered estimated. Dilutions were required for SVOC analysis, but did not adversely affect data. Dioxin/furan results for water samples were acceptable. Metals results were generally acceptable with no serious issues. Additional QC data are available in the DEQ archives, but were not reviewed. Data should be used and reported with all appended qualifiers.
1990	KPT / Yale Oil / Reliance	<i>Final Phase II Site Investigation Sampling and Analytical Results Report for the Kalispell Pole and Timber Site</i>	June 1990	MSE	Two monitoring wells were installed on the KP&T property, one shallow (GW-5, 26 ft) and one deep (GW-4, 135 ft). Nine groundwater samples were collected, two from the new monitoring wells on the KPT site, 4 from Yale Refinery monitoring wells (GW-4, GW-12, GW-13, GW-14), and three QA samples. Water level and survey measurements were performed on all existing wells at KPT, Reliance, and Yale properties.	P	Not all field data available for QC review. QC data are available in DEQ archives, but were not reviewed.
1991	KPT	<i>Sampling and Analytical Results Report for the Kalispell Pole and Timber Site</i>	October 1991	MSE	Three monitoring wells at KPT were sampled (GW-3, GW-4, and GW-5) and nine residential wells to the northeast, east, and southeast of KPT were sampled. The Evergreen Water District Well #1 (northeast) was also sampled.	P	Some results estimated (J), values for PCP as estimated with an "D" qualifier. Data are usable, but should be considered estimated. QC data are available in DEQ archives, but were not reviewed.
1991	KPT / Reliance	<i>Preliminary Extent of Soil Contamination & Hydrogeological Investigation - Kalispell Pole & Timber Site</i>	February 1992	EPA contracts Roy F. Weston Inc.	Field activities were conducted in three phases: Phase I - 12 soil samples were collected from KPT and 5 soil samples were collected from the Reliance site. Phase II - 12 monitoring wells (5 on KPT, 3 on Reliance, 4 on Yale) were sampled. Phase III - 15 trenches and 9 test pits within the KPT site and 133 surface and subsurface soil samples were collected.	F	Several furan isomer results for one sample as rejected (R). All other results, with the exceptions as noted, should be considered usable for all intended purposes with and reported with the appended qualifier.
1991	Wal-Mart	<i>Phase I Environmental Site Assessment for Wal-Mart Development, Evergreen, Montana</i>	October 1991	NTL Engineering and Geoscience, Inc. (NTL)	Historical document review and interviews with current owners, adjacent business owners, and local and state officials to determine potential environmental impacts to the property. Due to proximity to KPT, Reliance, and Yale facilities, a Phase II ESA is recommended.	X	-
1991	Wal-Mart	<i>Geotechnical Investigation, Wal-Mart Retail Development, Evergreen, Montana</i>	October 25, 1991	NTL	Twenty eight borings were installed and two test pits. The work was performed to determine soil characteristics for building construction and engineering purposes. Approximately 128 soil samples were retrieved during excavation of the borings; used to analyze for soil moisture, compression, etc.	X	-
1992	Wal-Mart	<i>Phase II Environmental Site Assessment, Wal-Mart Retail Development, Evergreen, Montana</i>	February 1992	NTL	Four borings installed (EH-1 through EH-4) and soil samples taken from each boring. Monitoring wells were installed in the three of the borings (EH-1, EH-2, and EH-3). All 3 wells were sampled in addition to a residential well, RW-1. Impacts of refinery operations noted and a Phase III ESA is recommended.	P	No QC data were reported for the TPH results. Surrogates, method blank, and matrix spike results were reported for SVOC analysis. All QC results were acceptable. Data were qualified as estimated (J) when the reported result was greater than the detection limit, but less than the reporting limit.
1992	Wal-Mart	<i>Phase III Environmental Site Assessment Seaman Mobile Homes, Kalispell, Montana</i>	August 24, 1992	Spratt & Associates Consulting Hydrogeology	Twenty three borings installed on the property, 8 of which were completed as monitoring wells (SW-5 through SW-12). Wells EH-1, MW-14, SW-5, SW-6, and SW-7 were sampled for groundwater.	P	Surrogates, method blank, and matrix spike results were reported for TPH and SVOC analyses. All QC results were acceptable. Data were qualified as estimated (J) when the reported result was greater than the detection limit, but less than the reporting limit.
1993	Wal-Mart	<i>Initial Site Assessment Preliminary Report</i>	March 29, 1993	Spratt & Associates Consulting Hydrogeology	Four monitoring wells were installed (PW-1, PW-2C, PW-2D, and PW-3) on the premises. Four soil samples were collected from the boreholes prior to finishing the wells, and upon completion, four groundwater samples were obtained from each new well. Envirocon, Inc. provided oversight.	Q	-
1993	Wal-Mart	<i>Larsen Property Groundwater Investigation</i>	May 7, 1993	Envirocon, Inc.	Envirocon, Inc. report detailing the monitoring well installation, sampling activities, and analytical results from Spratt & Associates work in March 1993 (see above).	Q	No associated QC results were reported with the sample results. As such, no assessment of data quality can be conducted at this time. Without further assessment, data should be used with caution.

TABLE 4-5
SUMMARY OF INVESTIGATIONS, INTERIM ACTIONS AND DATA QUALITY
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Year	Facility	Investigation Title	Year Published	Contractor/Agency	Summary of Investigation Activities	Category	Summary of Data Quality
1994	Yale Oil	<i>Abatement Activities Report for Aboveground Tank Bottom and Underground Piping, Exxon Former Bulk Plant, Kalispell, Montana</i>	April 15, 1994	AES	Removal action included demolishing all structures on property, removing old piping, excavating and removing the tank bottom. In addition, contaminated soil was treated by thermal desorption (approx. 10,465 cubic yards) and replaced.	P	Data from soil confirmatory sampling were reviewed. QC summaries were provided and reviewed. No serious issues were identified and results were reported with no qualification. As such, the results are acceptable as reported.
1994	Wal-Mart	<i>Remedial Action Report, Jefferson Center, Kalispell, Montana</i>	March 1, 1995	Tetra Tech, Inc.	Remediation work plan outlining the soil sampling, contaminated soil removal, soil permeability testing, monitoring well and an SVE/air sparging system installation, and monitoring at the Larsen and Seaman properties. (Four new wells installed, NW-1 through NW-4, and several existing wells redrilled)	P	Generally, method blanks, surrogate recoveries, and MS recoveries were acceptable. As such, soil data can be used as reported. Groundwater samples were collected and analyzed for BTEX and TPH-purgeables. Method blanks, surrogate recoveries, and LCS recoveries were acceptable. As such, data can be used as reported. In addition, soil confirmation samples were collected and analyzed for TPH-extractables by Anatek Labs. Only surrogate recoveries were summarized for the confirmatory samples. As such, data should be used with caution, since other QC data were not available for review. Air and water samples were analyzed for TPH-purgeables, TPH-extractables by Energy. Sample data also included blank results and surrogate recoveries; which were acceptable. Data are considered acceptable.
1995	Yale	<i>Final Quarterly Status Report, Former Exxon Kalispell Bulk Plant, Kalispell, Montana</i>	May 22, 1995	Secor International, Inc.	Quarterly groundwater sampling at the Yale Oil Refinery site. Three quarters of the Yale Refinery monitoring wells, GWY-3, GWY-4 and GWY-7 through GWY-13, were sampled in April, August, and October of 1995.	P	The April 1995 data package available for review consists of results forms and QC summaries for the analysis of SVOCs only. Data for VOCs and TCLP metals were not available. The laboratory method blank contained no detectable SVOCs, and the recoveries and RPDs were acceptable for the blank spike and blank spike duplicate (also known as LCS/LCSD). Accuracy and precision are acceptable for the analysis of SVOCs.
			September 25, 1995			P	The August 1995 data package available for review consists of results forms and QC summaries for the analysis of SVOCs, BTEX, TPH-DRO, and TPH-GRO. The laboratory method blank contained no detectable SVOCs, and the recoveries and RPDs were acceptable for the blank spike and blank spike duplicate. Accuracy and precision are acceptable for the SVOC analysis.
			November 27, 1995			P	The October 1995 data package available for review consists of results forms and QC summaries for the analysis of chlorinated herbicides, TPH-GRO, and TPH-DRO. The laboratory method blank contained no detectable herbicides or TPH-DRO, and the recoveries and RPDs were acceptable for the blank spike and blank spike duplicate. Accuracy and precision are acceptable for the analysis of herbicides and TPH-DRO.
1995	Wal-Mart	<i>Phase II Environmental Site Assessment</i>	June 1995	Tetra Tech, Inc.	Four borings installed (Borings 1 through 4) on the northwest corner of the Wal-Mart property. Soil samples taken from each boring. Temporary monitoring wells were installed in each boring and groundwater samples were obtained from each. A permanent well was constructed at Boring 1, but the other three temporary wells were abandoned.	X	-
1995	KPT	<i>Site Investigation Report for Kalispell Pole & Timber, Kalispell, Montana</i>	July 1995	Remediation Technologies, Inc. (RETEC)	Eight monitoring wells were installed on the KPT property (KPT-1 through KPT-8; in addition to GW-1 through GW-5 installed during the Weston 1992 investigation). Groundwater samples were collected from the new wells and soil samples were obtained from depths of 2 to 20 feet bgs at many of the same locations as the Weston 1992 study.	P	The data package available for review consists of results forms, and accompanying QC summaries. The laboratory reported some results as estimated (J). Acrolein result for KPT-3 should be considered unusable and qualified as rejected (R).
1996	Reliance	<i>Draft Feasibility Study Report for the Reliance Refinery Site</i>	December 1997	Pioneer Technical Services, Inc. (PTS)	PTS prepared a Feasibility Study (FS) for the Reliance facility in 1996 in order to evaluate potential remediation alternatives for surface and subsurface soils and sludge.	X	-
1996	Reliance / Yale Oil / KPT	<i>Final Phase I Remedial Investigation Report for the Reliance Refinery Site, Kalispell, Montana</i>	December 2000	PTS	Four monitoring wells were installed (GWRR-4 through GWRR-7). Nine groundwater samples were collected (7 from Reliance, 1 from KPT well GW-5, and 1 from Yale well GWY-12). 99 test pits were excavated and 115 soil samples were sent to a laboratory for analysis.	F	As part of the RI effort, a full validation was conducted on samples and the findings are reported as Appendix F in the RI report. No data were rejected and all results are valid and can be used for intended purposes with the qualifications noted in the RI.

TABLE 4-5
SUMMARY OF INVESTIGATIONS, INTERIM ACTIONS AND DATA QUALITY
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Year	Facility	Investigation Title	Year Published	Contractor/Agency	Summary of Investigation Activities	Category	Summary of Data Quality
1996	North of Reliance / Northeast of KPT	None	Data received but no report issued	DEQ	DEQ samples the Rask residential well because of reports of a diesel odor and dark gray material in water softener (as reported by resident). Residence is connected to public water supply.	Q	The sample was analyzed for DRO, chlorinated acids (including PCP), and VOCs. The data package includes a QC summaries along with the sample results. Surrogate recoveries and methods blanks were reported for all three analyses and were within QC limits. In addition, LCS recoveries were reported and within QC limits for DRO and chlorinated acids. As such, the results are acceptable and usable.
1998	KP&T	<i>Supplemental Remedial Investigation Report, Kalispell Pole & Timber, Kalispell, Montana</i>	March 16, 1998	Remediation Technologies, Inc. (RETEC)	Seventeen test pits (TP-100 through TP-104; TP-106 through TP-117) were dug on the KPT property and 15 soil samples were collected. Seven monitoring wells were also installed (KPT-9 through KPT-15). Groundwater sampling was conducted periodically on all accessible wells on KPT, Reliance, and Yale sites from September 1996 to August 1997.	P	Qualified data are usable, but should be considered estimated.
1996	KPT	<i>Work Plan for an Air Sparging Interim Measure at the Kalispell Pole and Timber Site, Kalispell, Montana.</i>	May 1996	Remediation Technologies, Inc. (RETEC)	Discussion of pilot-scale air-sparging system installed along the KPT property boundary. Eleven air injection wells (ASW-1 through ASW-11) were constructed on the KPT property and were operational in September 1996.	P	Qualified data are usable, but should be considered estimated.
1998	Reliance	None	Data received but no report issued	DEQ	DEQ personnel collected 50 shallow soil samples from the Reliance facility.	P	TPH/DRO review packages include calibration, method blank, and LCS QC summaries. Total lead review package includes method blank, LCS, and MS QC summaries. Since all reported QC results are acceptable, data are useable.
1999	KPT	<i>Pentachlorophenol Hot Spot Removal Work Plan</i>	January 15, 1999	The Retec Group, Inc. (formerly ThermoRetec Consulting Corporation)	Sixty-nine soil samples were collected from 42 locations on the KPT property in order to delineate PCP "hot spots" as part of a 1996 work plan. The results of that sampling event allowed ThermoRetec to prepare the <i>Pentachlorophenol Hot Spot Removal Work Plan</i> . ThermoRetec estimated approximately 400 cubic yards of soil should be removed.	F	Qualified data are usable, but should be considered estimated.
2000	KPT	<i>Excavation Completion Report</i>	July 28, 2000	The Retec Group, Inc.	The document discusses the removal action taken at the KPT facility in April 1999. Approximately 470 cubic yards of surface and subsurface (to 6 feet bgs) soil was removed. Three soil samples were collected from the pit before backfilling. One composite sample was taken from the excavated soil before disposal.	P	QC information available. Qualified data are usable.
2000	Yale Oil	Data received but no report issued	None	Maxim Technologies, Inc.	Groundwater samples were collected from GWY-3, GWY-4, GWY-10, GWY-12, GWY-13, and GWY-14 and analyzed for VPH.	Q	-
2001	KPT / Reliance / Yale Oil	<i>Kalispell Pole & Timber Data Summary Report, Kalispell, Montana: Volume 1 of 2: Report and Appendix A</i>	July 17, 2001	The Retec Group, Inc.	Discusses previous investigations and sampling efforts at the Reliance Refinery, the Yale Refinery, and the KPT sites.	Q	-
2002	Reliance	<i>Summary of Soil & Groundwater Characterization of the McElroy & Wilken Property, Reliance Refinery Facility</i>	July 2002	Land & Water Consulting, Inc. (LWC)	Two monitoring wells were installed on the Reliance Refinery site (GWRR-8 and GWRR-9). Soil samples were collected from 3 test pits and 2 surface locations on the McElroy & Wilken property.	P	QC summaries, including surrogate recoveries, trip blank, method blanks, LCS, MS/MSD, and instrument calibration verifications, were available for review. QC criteria were met. Accuracy and precision were generally acceptable. Laboratory qualifiers include notations regarding matrix interference, low surrogate recoveries, and MCL exceedances. Data are acceptable as reported with qualification appended by the laboratory.
2002	Reliance	<i>Phase II Remedial Investigation/Feasibility Study - Reliance Refinery Facility</i>	December 2002	Land & Water Consulting, Inc. (LWC)	Sixteen soil samples were taken from the northern area and three soil samples (for dioxin/furan analysis) were collected from the southern area of the Reliance Refinery site. Groundwater samples were collected from wells GWRR-1, GWRR-3, and GWRR-6 in July and October.	P	The only available data are the results summaries reported in the phase II RI/FS report, QC summaries for dioxin/furan analysis of three soil samples, and groundwater samples collected in October. The laboratory indicated that internal standard recoveries were as expected and reported correctly for dioxin/furan analysis. Laboratory method blanks contained no detectable dioxin/furan isomers. LCS results were acceptable. Overall the dioxin/furan data are acceptable with a few noted qualifications (see Appendix C). For groundwater analysis of TPH-extractables, TPH-purgeables, and SVOCs, the laboratory reported QC summaries, including calibration verifications, method blanks, and LCS. The QC results are acceptable. As such, the groundwater results obtained from the October sampling event are acceptable with the qualified placed on the results by the laboratory. No laboratory data packages or QC summaries were available for review for July groundwater samples. As such, a complete assessment of QC for these samples is not possible. Data for which no QC are available should be used with caution.

TABLE 4-5
SUMMARY OF INVESTIGATIONS, INTERIM ACTIONS AND DATA QUALITY
KALISPELL POLE AND TIMBER, RELIANCE, AND YALE OIL FACILITIES

Year	Facility	Investigation Title	Year Published	Contractor/Agency	Summary of Investigation Activities	Category	Summary of Data Quality
2002	Yale Oil	Data received but no report issued	None	Hydrometrics, Inc.	Groundwater samples were collected from GWY-3, GWY-4, GWY-10, GWY-12, GWY-13, and GWY-14 and analyzed for EPH and VPH.	Q	-
1999 - 2004	KPT / Reliance / Yale Oil	Semi-Annual Groundwater Monitoring Report	February 1999	The Retec Group, Inc.	Semi-annual groundwater monitoring events. Groundwater level measurements and groundwater samples taken from shallow and deep monitoring wells on the KPT, Reliance, and Yale sites.	P	Laboratory QC summaries were available for each groundwater monitoring event. Generally, QC limits were met with no serious issues affecting data quality. As such, data are usable with the qualifiers appended by the laboratory.
			July 2001				
			August 2002				
			April 2003				
			October 2003				
			April 2004				
			October 2004				
			April 2005				
2004	KPT	As Built Report, Full Scale In Situ Ozonation System, Kalispell Pole and Timber, Kalispell, Montana	January 21, 2005	Environmental Resources Management (ERM) West, Inc.	Report outlines the interim action taken to install an in situ ozonation system on the KPT site. Two new monitoring wells were installed (SBM-1 & SBM-2) as well as several ozone injection wells.	X	-
2005	Rocky Mountain Marine	Site Investigation Relative to Petroleum Hydrocarbon Impact to Subsurface at Rocky Mountain Marine	April 26, 2005	Corwin Environmental Consultants, Inc.	Four borings were excavated on the Rocky Mountain Marine property south of the Yale Oil facility. Eight composite soil samples were collected. Two monitoring wells (MW-01 and MW-02) were installed and groundwater samples were collected. All samples were analyzed for EPH screen.	P	Soil and groundwater samples were collected an analyzed for TPH-extractables by Northern Analytical Laboratories, Inc. Only sample results and surrogate recoveries were reported. Without additional QC summaries, a QC review was not completed. The results should be used with caution pending the review of additional QC data.

- Notes:
- F Data with full validation (that is not rejected) can be used both qualitatively and quantitatively for all intended purposes
 - P Data with partial validation or review (where selected results and QC data are validated) may be used to improve efficiency in the overall project decision-making; provided that critical samples or critical analytes are reviewed.
 - Q Data with no review (for which there is no available QC or supporting analytical data) can be used qualitatively, but should be supported with validated data
 - X No data available for review
 - KPT Kalispell Pole and Timber
 - NA Not applicable
 - Data not reviewed in the Data Summary Report (Assume Q)